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"STAR" PORTLAND CEMENT.

NEW YORK, March 19, 1883.

EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— Being informed that my advertisement on "Star" Portland Cement, on page xv. of your paper, with table of guaranties as advertised in Germany by the manufacturers, Toepffer, Grawitz & Co., Stettin, is misunderstood by persons who do not, or will not, take the trouble of consulting me for further information, you would oblige me very much by kindly giving publicity, through the columns of your influential paper, to the following explanations.

My advertisement gives figures of the tensile strength which manufacturers guarantee if their cement is tested according to the official German regulations. It by no means follows that the cement must prove to be so strong if tested by Mr. A. or by Mr. B. according to their own respective modes of preparing the samples. In Germany, where the cement question is well understood, most users of Portland cements having their own testing-machines, nobody pays more for the cement than it is worth, according to its strength; or in other words, according to the quantity of sand that can be added safely for concrete or mortar. Thus, while one German manufacturer sells at 8 marks, another must be satisfied with 6 marks per barrel of his cement, it being worth so much less. The uniform mode of preparing samples, according to firmly established rules as decreed by the Prussian Minister of Public Works, on Nov. 10, 1878, and practised in the Testing Department for Building Materials at the Royal Industrial Academy in Berlin, under the management of Dr. Böhme, is fully described in a circular which I send to those who are interested in the subject. The reader of my circular is informed that in Germany all cement samples are most carefully prepared, and, for instance, that in briquettes made of neat cement all air-holes are eliminated from the breaking area by a somewhat troublesome process. It follows that such samples must be stronger than those made of the same cement but in a less careful manner.

Mr. Henry Reid, the well-known English author on Portland cement, in writing on German testing, in his "Practical Treatise on Natural and Artificial Concrete" (E. & F. N. Spon, 44 Murray Street, New York) on page 370 says:—

"Owing to the careful manner adopted in making the briquettes, and the general management of cement-testing practised, better results are secured than those obtained by our careless and varying system in England. The briquettes are not put in water until twenty-four hours after moulding, and remain in the cistern for the number of days required by the intended test, so that practically the German tests are all one day older than the English." Mr. Reid is right in regard to the German seven-days' test only. "That fact," says Mr. Reid, "coupled with the extra care bestowed on their manipulation, gives an advantage of at least twenty per cent in their favor."

A well-known firm of Portland cement importers in New York invited me to prepare five samples of "Star" Portland cement, neat, according to the German rules. I made five briquettes; one was broken after having dried twenty-four hours in air, two were left twenty-four hours in air and six days in water, and two were twenty-four hours in air and twenty-nine days in water. A German testing-machine, of Dr. Michaelis, was used, and the results, according to the certificate of said firm, were as follows:—

No. 1,	24 hours	(dry)	212	lbs.	per	square inch.
" 2,	7 days	(wet)	610	"	"	"
" 3,	7 "	"	740	"	"	"
" 4,	30 "	"	800	"	"	"
" 5,	30 "	"	840	"	"	"

On examination of the breaking area of briquette No. 2, it was found that a small wood splinter from the barrel had introduced itself, which fact sufficiently accounted for No. 2 being less strong than No. 3 of same age. However, the strength of No. 2 still exceeded considerably that guaranteed by manufacturers, which is 40 kilos per square centimetre, equal to 568.9 per square inch for the German seven days' test.

Mr. John Grant, Member of the Institute of Civil Engineers, and of the Engineering Department of the Metropolitan Board of Works in London, in the correspondence on his paper on Portland Cement, published by the Institution of Civil Engineers in London, Vol. LXII, Session 1879–80, Part IV, on page 182, says:

"High as the standard of strength adopted by the German and Austrian associations might appear to English manufacturers, the principal manufacturers of Germany — of whom Herr Grawitz's firm in the North and Messrs. Dyckerhoff's in the South might be cited as examples — publicly guaranteed a strength for slow-setting cement double that of the standard rules; viz., 20 kilogrammes per square centimetre, or 284.46 pounds per square inch, with three parts of sand to one part of cement, at twenty-eight days."

Under the supervision of Mr. Elliot C. Clarke, Engineer of Improved Sewerage System, of Boston, tests were made last year with a number of German, English and American Portland cements, at the City Engineer's Department, of Boston, Mass. Mr. W. J. Condon was the cement inspector. He took the "Star" samples from twelve barrels selected at random from a lot in store on Messrs. Waldo Brothers' wharf in Boston.

On the 3d of August Mr. Condon wrote to me: "I have to-day finished the seven days' tests of your cement. While it does not arrive near your published statements [here Mr. Condon forgets that manufacturers guarantee the published figures only if the samples are made according to the Official German Regulations] it is so far in advance of other cements tested at the same time and under the same conditions, that I am convinced that your statements as to its value are in no way exaggerated."

These results were fully borne out by Mr. Condon's thirty days' tests. He wrote, on the 28th August: "The cement has proved to be of unusual strength, being much stronger than any that I have met with in an experience of eight years as a cement inspector."

On my visit to Boston, later on, Mr. Clarke kindly showed me his table of the results of the various tests made in his department. In this table the "Star" brand figured at the head, as usual, and another German brand was second in strength.

Those who wish to learn more about German testing may address me for further particulars, or write to Dr. Böhme, Superintendent of the Testing Department for Building Materials at the Royal Industrial Academy, 35 Kloster Strasse, Berlin, Germany, who no doubt will give every desirable information.

Another object of my advertisement is to call attention to the existence of official regulations, as introduced in Germany, Austria, Russia and Sweden, and still wanted in England and in the United States, I am sorry to say. Uniformity in testing would be the best and only means of opening the eyes of users and dealers of Portland cements, in regard to the relative values of the various brands — the only way to show which cement is the most economical. A high-priced cement is very often much cheaper than a low-priced. To accurately ascertain this by the rule-of-thumb system in practice is simply impossible; but with a reliable testing-machine this can easily be done, if all samples are made in a careful and uniform manner. This is best proved in Germany, where users are not in the habit of wasting their money, and do not mind the trouble and expense of testing the material or having it tested at the Berlin Academy.

Kindly excuse my trespassing so much on the valuable space of your paper. I remain, dear Sirs, Your obedient servant,

GUSTAV GRAWITZ,
196 BROADWAY, NEW YORK.

TERRA-COTTA LUMBER.

THE combination of useful and novel properties characterizing Terra-Cotta Lumber will give it an almost unlimited range of employment in science, art and mechanics.

There is no secret or complicated process, either chemical or mechanical, required for the production of Terra-Cotta Lumber.

The following descriptive article from the *Perth Amboy Republican* of September 6, 1882, will be found interesting: —

A new industry has made its advent in Middlesex County, and the "top clay" or Kaolinite, heretofore considered of little or no value, which so heavily overlies its immense deposits of fire-brick clays, has in consequence found a new and permanent customer.

Much gossip among our clay manufacturers has been elicited during the past few months by the erection of a large steam factory at Crow's Mill, two and a half miles west of here, on the Raritan River, by a New York company, for the avowed purpose of manufacturing fire-proof lumber out of fire-clay.

In common with others, we last week visited this modern Menlo Park, and upon the assurance that the place was free to visitors, walked in, and thus describe to our readers what we saw. Approaching the factory from the west, a two-storied brick structure about one hundred and fifty feet square, the visitor enters the fire and engine room, where a battery of three large tubular boilers enables a one hundred and twenty horse-power engine in close proximity to create the immense hum and clatter of machinery, which, though heard before, now breaks uncomfortably upon the ear.

Parallel to, and extending the whole length of the mill, from west to east, is the main shaft, to which is attached a row of powerful clay grinding mills, or "chasers," eight in number, encompassed each by huge iron pans into which clay and sawdust are dumped in varying quantities by busy attendants with wheelbarrows.

Twenty minutes of rapid revolutions of these monster wheels, weighing over three tons, suffices to grind and mix the contents of the pans — about twelve hundred pounds — to which, meanwhile, a couple of pailfuls of water has been added to render the compound plastic.

The motion of the mills is now checked, and the mill men, jumping into the pans, quickly shovel the mushy mixture out upon a wide rubber belt, which, adjusted on pulleys, travels at moderate pace to the centre of the building, and deposits its load in a pit dug below the surface of the floor.

From this pit emerges an elevator-shaft, where ascending buckets catch the mush dropped by the "traveller," and carry it by mouthfuls through the second story to a cupola built upon and outside of the roof, where, by the aid of two flights of stairs, we will follow it.

Here we find an immense iron cylinder, which, taking steam direct from the boilers below, forces a heavy steel plunger down and up through the open head of a corresponding cylinder directly underhanging. As the plunger is lifted, a couple of men plying shovels actively fill the hollow cylinder below with the spongy mass, elevated as described, which in turn is forced downwards and out of sight by the descending plunger under an estimated pressure of thirty tons. Quickly descending to the second floor, the looker-on catches sight of what appears to him as two streams of logs or slabs — in shape not unlike deck-plank, four inches by twelve — issuing freely from the lower end of the mud-cylinder, whose upper end was described as opening into the room above. As these planks of mud (no longer mush, but smooth and hard to the touch) acquire the desired length of from two to four feet, they are adroitly cut off by a knife driven by steam, and removed on barrows to the drying-rooms outside and inside of the building. Here no artificial heat, except in winter, is required. Pure clay requires careful protection in drying lest it warp or crack. Not so with this compound of clay and sawdust. Wind and sun are both welcomed as auxiliaries in the drying process, which usually occupies from four to six days.

Six large kilns, of old-fashioned beehive shape, are ranged parallel with the factory, on its south side, and into these the material when dry is closely stowed. Fires are applied from outer openings. Some twelve hours are expended in "smoking," *i. e.*, carefully, by gradual increasing heat, driving out the moisture, when the sawdust in the compound ignites and burns out, causing, within twenty-four hours, the whole interior to become a fiery incandescent mass.

As no damage can occur in rapid cooling, the doors of the kiln are torn down at once, and, in thirty hours after, its contents are removed into another part of the building by the aid of five-ton cars, pushed by men over a railroad track which ramifies through every part of the premises, from mill to yards, from yards to dock.

The mush is now a mineral sponge of the finest texture. Driven by a shaft extending the full length of the mill, belted pulleys give rapid motion to the driving machinery — edging, splitting and cutting-off saws, planing, tonguing and grooving, bevelling and tenoning machines and turning lathes.

Possessing no fibrous texture like wood, the strength of the material arises from incipient vitrifaction, obtained in firing, and half-inch boards, smoothly planed and jointed, are handed to the visitor for inspection, which exhibit greater strength and tenacity than dry oak of equal thickness, when sawed athwart its grain. It is, indeed, rightly named lumber — for every shape which can be given wood, with edged tools, can be given this.

It is apparently worked as easily as pine or spruce, and is half the weight of building brick, and tightly retains plastering without first lathing. To display the resistant qualities of the Terra-Cotta Lumber to fire and water, the foreman, with a slender iron rod, withdrew from the centre of a burning kiln, a red-hot "trial piece," about four inches square, and plunged it into a pail of water. After cooling, it was placed upon the blacksmith forge, and the water with which it was saturated expelled in shape of steam; then pouring petroleum over it, the foreman ignited it with a lighted match, and presented the writer with an elegant torch, remarking "that it would burn long enough to boil a tea-kettle." Subsequent examination of the block, by sawing it in twain, discovered no difference in appearance from the other material which had not been submitted to so fiery an ordeal.

Terra-Cotta Lumber is the invention of Charles Carroll Gilman, of Eldora, Iowa, who is also President of the Company whose works we have endeavored to describe. This Company have purchased the Potter Estate, adjoining their present site, and have begun the erection of a "plant," estimated to cost in the aggregate $200,000, with a capacity of a daily output of one hundred tons of finished work, of which the first twelve thousand tons will go into the magnificent apartment-buildings now being erected by José F. Navarro, upon 58th and 59th Streets and Seventh Avenue, New York City.

We can but predict a great future for Terra-Cotta Lumber.

The specifications of the Patent are clearly defined, and cover the following points:

1. The use of kaolinite, or clay without grit, unmixed with sand or sandy clay.

2. The method of manipulation by steam machinery while in a plastic state.

3. The dressing with edged tools subsequent to firing.

Any known infringement of any or all of these claims will be promptly followed by an effort on the part of the Company to punish the offenders in the courts of highest jurisdiction.

All persons interested in the production of a new and valuable building material are invited to visit the factory, and examine for themselves the process of manufacture by

THE NEW YORK TERRA-COTTA LUMBER CO.,
71 Broadway, New York.

NOTES.

The Solderless Standing-Seam Conductor Company, of Alleghany, Pa., are now making their conductor (in addition to its previous manufacture of best bloom galvanized-iron) out of IX terne plate made from soft steel, which they import in sheets of 30″ x 72″, thereby making the full six-foot section of conductor in a single piece of tin plate — a size which, we believe, has never before been made in tin conductor pipes. These tin conductors have all the advantages of expansion possessed by the galvanized-iron of this pattern, and are sold at about the same price per foot as ordinary round conductors made of IX charcoal tin plate. Some architects, in fact, specify them in preference to the galvanized-iron ones.

Mr. Samuel West, 471 Tremont Street, Boston, Mass., has discovered an inexpensive way of utilizing the unmeasured minute bits and scraps of colored glass that are now wasted by stained-glass workers. A simple design of cathedral glass with extra deep leads serves as the foundation of a simple panel, to which a border of varying size and distribution of parts is added by enclosing between sheets of plain glass, before and behind the whole panel, layers of refuse particles of colored glass which are kept from encroaching on the central design by the heavy leads we speak of. The effect is kaleidoscopic to the last degree, as the bits are not fitted together, and the least jar serves to slightly change the effect of the whole. By roughly classifying the colors a richer effect can be secured than by using unsorted colors.

We regret to learn that on March 5, the Clark Terra-Cotta Works were destroyed by fire. Many valuable models were destroyed.

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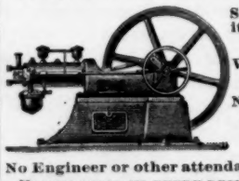

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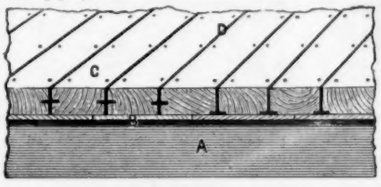

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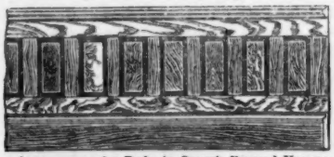

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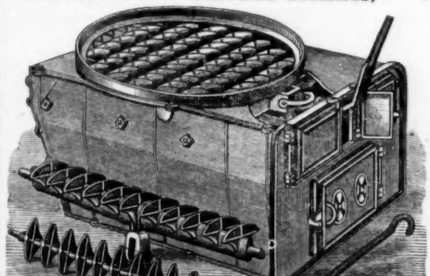

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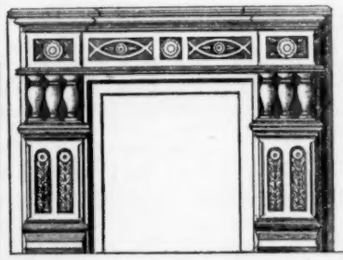

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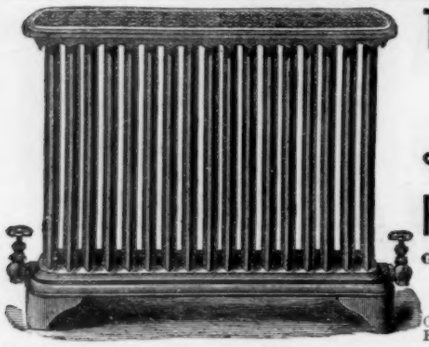

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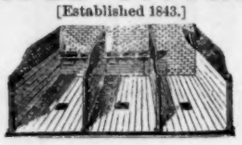

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WE publish in another place a letter from Mr. Bloor, Secretary of the New York Chapter of the American Institute of Architects, which gives an interesting account of some of the circumstances connected with the bequest of the late Levi H. Willard of New York, to the Metropolitan Museum of Art, for the purpose of forming a collection of objects of architectural art. Most of our readers have probably seen in the daily papers some notice of this bequest, which seems likely to mark an era in the history of architecture in this country. No one, it seems to us, can fail to see that the great need of art here is a supply of good models. Among our young architects and artists are to be found an intelligence, enthusiasm and quickness of perception quite equal to those shown by any in the world, but an art cannot be developed out of enthusiasm alone, and they suffer as much while they are students from the lack of good models to refresh their minds, wearied by universal vulgarity, as they do in after years from the feebleness of the response which the public, accustomed only to bad work, makes to their best efforts. The task of making the collection will not be an easy one, and the profession, even more than the public, should be congratulated that it is likely to be committed to such able hands.

TO the unfailing kindness of the same correspondent we owe a copy of the Senate Bill, number 176, known as the Browning bill, which is now pending before the Legislature of New York, as a substitute for, or rather as an improvement on, the present building law of that State. The New York building law is, so far as we know, the oldest, and also the most detailed and precise, of any in the country, and very many of our readers would be glad to see the text of the draft of the bill presented in full. The order of the sections in the new bill is the same as in the present law, so that it is easy to compare the two. The first innovation of importance proposed is a regulation by which dwelling-houses not over thirty feet in height may be built with exterior walls of brick eight inches in thickness from the level of the first floor to the roof-plate. The present statute considers all buildings less than fifty-five feet in height in a lump, and requires indiscriminately that all walls of less height shall be twelve inches thick. There can be no question that for small, light dwelling-houses eight-inch walls are quite thick enough, and the passage of this provision will lessen the cost of workingmen's houses materially, without taking from them any real security. Party walls, unlike exterior walls, are required in all cases to be twelve inches thick, which, considering the danger that fire may pass from one house to another through an eight-inch wall by means of the beams embedded in it, seems judicious. A similar provision, for allowing the construction of eight-inch brick walls for small houses, has been repeatedly introduced in the Massachusetts Legislature, but has not yet found there the favor which it merits. The new New York law goes on to specify the required thickness of walls of various heights with much more minuteness than the old one, making generally a slight reduction from the excessive dimensions required under the present statute, and exchanging the requirements in regard to walls of buildings more than thirty feet in width, which have hitherto been rarely enforced, for a reasonable and fair regulation.

ALMOST important provision contained in the new bill is one requiring all structures more than one hundred feet in height to be made fire-proof throughout; the term "fire-proof" being defined in a subsequent clause to indicate a structure with floors of iron beams and brick arches. After the rules for the thickness of walls comes a set of directions for the proper laying of brick, and composition of mortar, which are excellent in most respects, although the change from the former statute, in requiring cement-mortar to be made of three parts sand to one of cement, instead of two to one, seems to us a doubtful improvement. The best quality of Rosendale cement will unquestionably bear three parts of sand, but with Rosendale of inferior brands, or with Portland cement, even of good quality, such a mixture would, we think, be too slow in hardening to be advantageously used under the trying conditions of New York building. It is singular that the specified proportion of lime to sand for lime-mortar, — three to one — is the same as that for cement-mortar. It is true that a great deal of slightly hydraulic ground-lime is used in New York, which will take less sand than the richer Eastern limes, but it certainly seems unreasonable to suppose that the same proportion can be equally good for both materials. After specifying that all elevator-shafts must be enclosed with fire-proof materials, the bill contains a long clause relating to the construction and arrangement of theatres, which is, so far as it goes, admirable. The only fault to be found with it is that it is not stringent enough, but its framers probably knew just how far public opinion would support them. In regard to the method of enforcement of the law, few changes are made; the most important being a restriction of the power of the head of the Bureau of Buildings to modify the provisions of the statute, which under the present law is general, to the particular cases of alterations of old buildings, use of party-walls, and occasions where there are practical difficulties in the way of carrying out the strict letter of the law; besides an extension of the right of appeal from the decision of the chief inspector. On the whole, the new bill is a decided advance upon the present law, and deserves to pass.

A STORY, very similar to others which have been told before, is related in the *Lancet* in regard to a serious case of typhoid-fever poisoning in England. It seems that at Clapham, a pleasant quarter of London, twenty-one persons were recently attacked, almost simultaneously, with fever, although they lived scattered among sixteen different houses. The houses were all of the better class, and on examination the sanitary condition of all was found to be reasonably good. The only circumstance which seemed to point to a common origin for the different fever cases was that all the persons affected had taken milk furnished from the same dairy. The condition of the farms from which the milk was brought was next investigated, and it was found that the water used for supplying the cows, and also, probably, for washing out the milk-cans, was brought through pipes which leaked in various places, and particularly at a point where they passed near a vault into which the excretions from several typhoid-fever patients had been thrown some months before. The *Lancet* concludes from this that the milk was without doubt the vehicle of infection, and as a case precisely similar occurred a few years ago, it may be presumed that this conclusion is correct. The strangest part of the affair is that the typhoid germs should have retained their vitality for so long a time apparently undiminished; but in view of the proofs found by Pasteur that the ferment of anthrax loses nothing of its virulence after being buried many years in the ground there is perhaps nothing surprising in this. Some time

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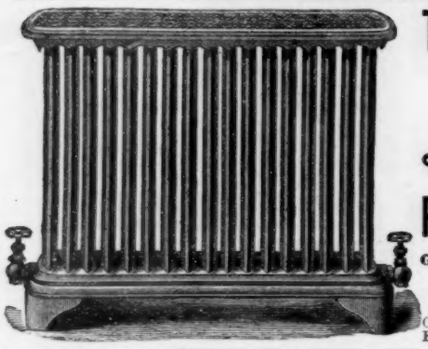

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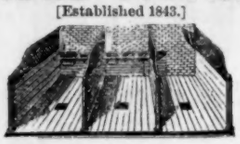

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WE publish in another place a letter from Mr. Bloor, Secretary of the New York Chapter of the American Institute of Architects, which gives an interesting account of some of the circumstances connected with the bequest of the late Levi H. Willard of New York, to the Metropolitan Museum of Art, for the purpose of forming a collection of objects of architectural art. Most of our readers have probably seen in the daily papers some notice of this bequest, which seems likely to mark an era in the history of architecture in this country. No one, it seems to us, can fail to see that the great need of art here is a supply of good models. Among our young architects and artists are to be found an intelligence, enthusiasm and quickness of perception quite equal to those shown by any in the world, but an art cannot be developed out of enthusiasm alone, and they suffer as much while they are students from the lack of good models to refresh their minds, wearied by universal vulgarity, as they do in after years from the feebleness of the response which the public, accustomed only to bad work, makes to their best efforts. The task of making the collection will not be an easy one, and the profession, even more than the public, should be congratulated that it is likely to be committed to such able hands.

TO the unfailing kindness of the same correspondent we owe a copy of the Senate Bill, number 176, known as the Browning bill, which is now pending before the Legislature of New York, as a substitute for, or rather as an improvement on, the present building law of that State. The New York building law is, so far as we know, the oldest, and also the most detailed and precise, of any in the country, and very many of our readers would be glad to see the text of the draft of the bill presented in full. The order of the sections in the new bill is the same as in the present law, so that it is easy to compare the two. The first innovation of importance proposed is a regulation by which dwelling-houses not over thirty feet in height may be built with exterior walls of brick eight inches in thickness from the level of the first floor to the roof-plate. The present statute considers all buildings less than fifty-five feet in height in a lump, and requires indiscriminately that all walls of less height shall be twelve inches thick. There can be no question that for small, light dwelling-houses eight-inch walls are quite thick enough, and the passage of this provision will lessen the cost of workingmen's houses materially, without taking from them any real security. Party walls, unlike exterior walls, are required in all cases to be twelve inches thick, which, considering the danger that fire may pass from one house to another through an eight-inch wall by means of the beams embedded in it, seems judicious. A similar provision, for allowing the construction of eight-inch brick walls for small houses, has been repeatedly introduced in the Massachusetts Legislature, but has not yet found there the favor which it merits. The new New York law goes on to specify the required thickness of walls of various heights with much more minuteness than the old one, making generally a slight reduction from the excessive dimensions required under the present statute, and exchanging the requirements in regard to walls of buildings more than thirty feet in width, which have hitherto been rarely enforced, for a reasonable and fair regulation.

ALMOST important provision contained in the new bill is one requiring all structures more than one hundred feet in height to be made fire-proof throughout; the term "fire-proof" being defined in a subsequent clause to indicate a structure with floors of iron beams and brick arches. After the rules for the thickness of walls comes a set of directions for the proper laying of brick, and composition of mortar, which are excellent in most respects, although the change from the former statute, in requiring cement-mortar to be made of three parts sand to one of cement, instead of two to one, seems to us a doubtful improvement. The best quality of Rosendale cement will unquestionably bear three parts of sand, but with Rosendale of inferior brands, or with Portland cement, even of good quality, such a mixture would, we think, be too slow in hardening to be advantageously used under the trying conditions of New York building. It is singular that the specified proportion of lime to sand for lime-mortar, — three to one — is the same as that for cement-mortar. It is true that a great deal of slightly hydraulic ground-lime is used in New York, which will take less sand than the richer Eastern limes, but it certainly seems unreasonable to suppose that the same proportion can be equally good for both materials. After specifying that all elevator-shafts must be enclosed with fire-proof materials, the bill contains a long clause relating to the construction and arrangement of theatres, which is, so far as it goes, admirable. The only fault to be found with it is that it is not stringent enough, but its framers probably knew just how far public opinion would support them. In regard to the method of enforcement of the law, few changes are made; the most important being a restriction of the power of the head of the Bureau of Buildings to modify the provisions of the statute, which under the present law is general, to the particular cases of alterations of old buildings, use of party-walls, and occasions where there are practical difficulties in the way of carrying out the strict letter of the law; besides an extension of the right of appeal from the decision of the chief inspector. On the whole, the new bill is a decided advance upon the present law, and deserves to pass.

A STORY, very similar to others which have been told before, is related in the *Lancet* in regard to a serious case of typhoid-fever poisoning in England. It seems that at Clapham, a pleasant quarter of London, twenty-one persons were recently attacked, almost simultaneously, with fever, although they lived scattered among sixteen different houses. The houses were all of the better class, and on examination the sanitary condition of all was found to be reasonably good. The only circumstance which seemed to point to a common origin for the different fever cases was that all the persons affected had taken milk furnished from the same dairy. The condition of the farms from which the milk was brought was next investigated, and it was found that the water used for supplying the cows, and also, probably, for washing out the milk-cans, was brought through pipes which leaked in various places, and particularly at a point where they passed near a vault into which the excretions from several typhoid-fever patients had been thrown some months before. The *Lancet* concludes from this that the milk was without doubt the vehicle of infection, and as a case precisely similar occurred a few years ago, it may be presumed that this conclusion is correct. The strangest part of the affair is that the typhoid germs should have retained their vitality for so long a time apparently undiminished; but in view of the proofs found by Pasteur that the ferment of anthrax loses nothing of its virulence after being buried many years in the ground there is perhaps nothing surprising in this. Some time

ago it was asserted, as an illustration of the persistent character of organic contagions, that several laborers employed in making excavations in the place where the victims of the black death in Florence were buried, in the fourteenth century, died with all the symptoms of the same disease; and this may perhaps be less incredible than it appears.

SOME very curious observations have recently been made with the microscope upon the constitution of the air, and it seems likely that this mode of analysis will soon supersede the determination of carbonic acid, which has hitherto served as a rough indication of the purity or impurity of the atmosphere in any given place. M. Miquel, an expert microscopist in Paris, has ascertained the number of organic germs in a cubic metre of air from various parts of that city, and finds that the atmosphere of the park of Montsouris, on the outskirts of the town, contains on an average fifty-one germs to the metre. That of a room in the observatory near the park shows three hundred and twenty-five, and that of the Rue de Rivoli, which runs through the centre of Paris, beside the garden of the Tuileries and other open spaces, six hundred and eighty to the metre. Air taken from a bed-room in the Rue Monge, in the crowded part of the city, gave five thousand two hundred and sixty germs to the metre, and that from a ward in the hospital of La Pitié yielded, in spring, seven thousand seven hundred and thirty, and in winter thirteen thousand two hundred and eighty. In passing from an elevated position to the lower levels of the city the difference is even more striking. At the summit of the Pantheon the average number of atmospheric organisms was twenty-eight to the metre, while in the street below it was found to be four hundred and sixty-two.

THE pleasant anticipations of the community that a law would soon be passed by the Legislature of New York under which the ground about Niagara Falls would be taken for public use, have been chilled by the determination of the Senate Finance Committee to report adversely upon the bill, which has already passed the Assembly by a large majority. This decision is probably made in accordance with the usual and praiseworthy desire of such bodies to lessen the public burdens to the utmost, but there can be no question that the reclamation of the Falls, if not a necessity, approaches very near to one, and as the cost will probably be less now than at any future time there is wisdom in accepting the inevitable at the time when there is most economy in doing so. Some of the daily journals see in the action of the Committee the effect of the influence exercised by the owners of riparian rights, who do not wish to see their mill-privileges sacrificed, but nobody expects to take their property without compensation, and a mill-privilege on the Falls or the Rapids is not so easily brought into serviceable shape that a prudent man need hesitate long about selling it for a reasonable price.

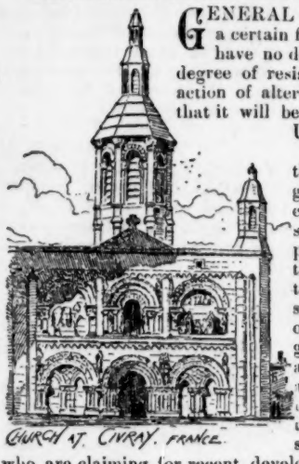
M. GASTON TISSANDIER, who is, perhaps, of all persons living the best authority on the subject, delivered recently before the Conference of the Sorbonne an essay upon the "problem of directing balloons," which is of great interest. The paper seems to have been suggested by the approach of the one hundredth anniversary of the invention of the balloon, which is to be celebrated on the fifth of June in the present year; that being the day on which, a hundred years ago, the first balloon, filled with heated air, was sent up by the brothers Montgolfier from their home at Annonay. The idea of directing the course of such bodies in the air seems to have occurred immediately after their invention, and many devices were suggested for accomplishing this result, the most curious, perhaps, being one which proposed to employ large bellows, placed in the car, and so directed that the blast from them would strike against sails which were also attached to the balloon. Another travelling balloon was to be constructed like an elongated squirrel-cage, large enough to carry five thousand passengers, all of whom would be obliged to climb continually up the sides of the revolving mass, and thereby impel a vast helix, fixed to the outside of the balloon, which could thus be driven through the air; and a third was proposed, to be armed with magnets, which would draw it always toward the north pole.

THESE, and similar inventions, having in some instances proved fatal to their over-confident authors, seem to have brought the subject of aerial navigation into disrepute, and no advance in the art was apparently made until 1851, when a poor, but talented young engineer patented a design for a balloon capable of being turned or directed at will through the atmosphere. This engineer was the celebrated Henri Giffard, who lost no time in reducing his theories to practice. With two of his friends, MM. David and Sciama, engineers of the Ecole Centrale, he constructed a balloon of an elongated ellipsoidal shape, one hundred and forty-three feet in length, and thirty-nine feet in diameter at the largest part, sustaining a long wooden beam, to one end of which was attached a sail, moving laterally as required, and serving both as keel and rudder. From the beam was hung a small basket, containing a steam-engine, constructed by Giffard for the purpose, and weighing, with its boiler, and coal and water for starting, only five hundred pounds. This engine operated a light screw-propeller, fixed to the end of the basket. As Giffard was poor, he was obliged, to obtain funds for his work, to make of his first trial a public spectacle, and he ascended from the Hippodrome in Paris on the twenty-fourth of September, 1852. The balloon was filled only with ordinary illuminating gas, but it took the aeronaut, with the engine and boiler, and about four hundred pounds of provision of fuel and water, easily into the air. The wind was very strong, and the little screw, only about ten feet in diameter, was powerless to drive the huge bulk of the balloon against it, but with one hundred and two revolutions to the minute it was easy to steer at a considerable angle with the direction of the wind, to describe arcs of circles, and even to make head in opposition to it for a moment at a time. After sailing in this way for some hours, at an elevation of a mile, the aeronaut descended safely in Normandy. Three years after this another ascension was made with a similar, but somewhat larger balloon; and although the violence of the wind again prevented the entire success of the experiment, the action of the propeller and the rudder, this time somewhat improved, was as perfect as before. For twelve years after this, Giffard's attention was absorbed in the invention and manufacture of the boiler injector by which he made his great fortune, and it was not until 1867 that he appeared again as the constructor of the great captive balloon at the Exposition of 1867. Returning later to his first invention, he determined to repeat his experiments of 1852 and 1855 on a much larger scale, and deposited in bank a million francs, to be drawn upon for carrying his new plans into execution. In the very midst of his labors he was attacked by an illness which left him almost totally blind; and the task which he was forced to abandon has not yet been taken up by any one else.

A VERY liberal offer has been made to young artists by the proprietors of *Harper's Weekly*, who propose to reward the author of the best original drawing to illustrate a Christmas hymn by Alfred Domett, published nearly fifty years ago, with a prize of three thousand dollars, to be spent in studying art at home and abroad. The competition is limited to American artists under twenty-five years of age, and of course no drawing is to be received which is not the exclusive work of the person offering it. The publishers of the *Weekly* will send a printed copy of the poem to be illustrated to any one who desires it, and all drawings must be submitted on or before August 1, 1883. The announcement of the name of the successful competitor will be made simultaneously with the publication of his drawing, in December, 1883. Three well-known artists, Messrs. R. Swain Gifford, F. D. Millet, and Charles Parsons, will act as judges, and there can be no doubt that the trial will excite great and wide-spread interest.

AN ingenious flushing-tank has been placed upon the market by Messrs. Doulton of Lambeth, which is likely, judging from the frequent inquiries made, to find favor in this country. The principle of the apparatus is much like that of Field's Annular Siphon flush-tank, the flush being obtained by means of an annular siphon, brought into action by the opening of a valve at the bottom, instead of by the filling of the small weir of the Field siphon. The opening of the valve is effected by the elasticity of the air in the siphon, gradually compressed by the rising of the water in the outer bell. A variation on the simple flushing-tank is made by covering the outer siphon, or bell, with a larger bell, the edge of which dips below the surface of the water. This prevents grease from entering the siphon, and the apparatus serves both as grease-trap and flush-tank, while the choking of the siphon is prevented.

ARTIFICIAL STONE AS A BUILDING MATERIAL.



GENERAL Gillmore, in a recent report upon a certain form of artificial stone, says: "I have no doubt that it is capable in a high degree of resisting the effects of heat, and the action of alternate freezing and thawing, and that it will be durable in the latitudes of the United States and the Canadas."

It has long been freely admitted that very simple concretes have great endurance in the tropical countries, but it is now demonstrated that they may be so tempered as to be equally reliable in the temperate zone. I do not intend to claim for either of the several methods a preference over others, but simply to assert their generic title to a respectful and attentive consideration. The high antiquity of similar products is beyond dispute, and the high authority of modern scientists is strongly upon the side of those who are claiming for recent developments the attention due to the revival of a "lost art." The word *adobe* is perhaps the oldest word in general use to preserve its signification throughout all ages and all climes. Derived from the Egyptian word *adoub*, still used by the Copts, carried by the Moors to Spain, thence to America, thence to the Sandwich Islands, and now to China, it may be said to have made the circuit of the globe. Everywhere it expresses the same thing and bespeaks the natural tendency of man to look about him for a cheap, durable and sufficient building material, which has evinced itself ever since Cain went out from his father's house and "builded a city."

Rude samples of artificial stone have come down to us from the earliest annals — even from pre-historic times. It seems, therefore, a very little thing to so improve upon these as merely to give them symmetrical and ornate form. This is chiefly what the present movement claims or can claim. What a simple proposition it seems to be! And yet it is one that modern engineers and architects have been very slow to entertain. Even in this field, however, Nature has been before us. We find her wonderful creations — symmetrical, multiform and ornate — in the hidden caves and grottoes of the earth, where percolation quietly reveals her stilly processes,—in the "wonderlands" of New Zealand or in our more wonderful recesses of Wyoming, — in the basaltic rocks of Ireland, or in the fastnesses of our Rocky Mountains. She has thus demonstrated not only how rocks and quarries have been created, but that stone may be fashioned into ornate or fantastic shapes in the very process of formation. How pointedly we are invited therefore to this field! Ruskin in his "Stones of Venice" beautifully remarks, "all noble ornamentation is the expression of man's delight in God's work." Indeed every worthy effort of Art is in some way an imitative tribute to some work of the Great Architect.

The artificial production of stone is simply the attempt upon the part of man to effect by rapid manipulation what Nature is constantly doing by slower and imperfect means. If plants may be improved by culture, if fruits may be made more luscious, if animals may be brought into subjection, nay, if man himself may be transformed from a rude, uncultivated child of the forest to a capable, industrious, intelligent citizen, why may we not also expect to improve upon Nature in the simple production of stone? If we discover her throwing certain elements, in shapeless masses, into the recesses of the earth, to be excavated only by herculean effort, and shaped into form by patient and laborious skill, why may we not take these same elements, in their plastic condition, and mould them into whatever form the arts require? The same order of intelligence which prompts us to improve upon Nature in other directions leads us intuitively to this.

Within the last fifty years much attention has been directed to this subject, but more particularly within the last decade. Forty-five years ago there was erected on the north shore of Staten Island, in New York Harbor, a stately, battlemented mansion, formed exclusively of artificial stone, familiarly known as "the cement house," every block of which was moulded on the spot. Although a mere stripling at the time, I became deeply interested in the work, and a few months ago visited the spot and found the building not only in perfect preservation, but was told that a master workman, who was recently called to make some alterations upon it, was of the opinion that if it should ever be demolished it could only be done with dynamite! Its position is upon a high bluff, of great exposure and bleakness, the north winds sweeping with unbroken force upon it from over the Newark meadows and the bay of New York for several miles. The walls are very thick and constantly hardening with age. As a test of endurance in this climate, no one need ask for anything more conclusive.

But a more interesting, because a more expensive and an entirely monolithic building,[1] has of late years been erected at Port Chester, N. Y., upon an eminence overlooking the boundary line between the States of Connecticut and New York. This is the palatial residence of Wm. E. Ward, Esq. It is built entirely of artificial stone — the foundation and the roof inclusive — towers, colonnades, floors, staircases, balustrades, balconies, porches and all. Its construction occupied five years, its cost $100,000, and it has been occupied by the family of its enterprising proprietor since 1876. Its strength may be imagined when we state that when the parlor floor, with a span of eighteen feet, had been laid one year, a weight of twenty-six tons was piled in the middle of it and left there through the winter, the apparatus arranged for determining the deflection showing only one hundredth of an inch depression. Here is another instance of an elegant private residence standing upon an eminence of unusual exposure, swept by the direct north-easterly gales of Long Island Sound, and thoroughly weather-proof and fire-proof. An exhaustive description of this building, and of *béton* construction generally, is to be read before the American Society of Mechanical Engineers, at their meeting, to which I respectfully refer your professional readers, quite confident that it will amply repay them.

Another interesting building, an immense warehouse, six stories in height, and covering an entire square, 360′ x 400′, has recently been erected at Chicago, by the well-known firm of J. V. Farwell & Co. The first story of this building is entirely of artificial stone, moulded on the spot, and laid up in the usual manner. The stone is dressed and finished with chamfered edges, and has not cost one-fourth the price of limestone or sandstone. I have had the opportunity of examining this work quite recently, and find that it has stood the severe tests of the past winter without a check or blemish of any kind. The same may also be said of a monolithic retaining-wall erected last summer at Fort Snelling, Minn., where a structure of natural stone had proved inadequate, and had to be taken down.

I could extend this article by further instances of the kind, but must be content to simply mention some of the most noteworthy—a section thirty-seven miles in length, of the Vanne Aqueduct of Paris—an entire Gothic church, with its foundations, walls and steeple, at Vesinet, near Paris, the municipal barracks of Notre Dame, the jetties at the entrance of the Suez Canal and at the mouth of the Mississippi River, the great mole of Cherbourg, the Port Said breakwater and light-house, the harbor works of Alexandria and Marseilles, the Mont Cenis tunnel, etc. And if I should venture upon the inviting fields of historic and pre-historic evidence I should transcend by far the limits to which I have promised to confine myself. As has been said by a high authority, "there is scarcely any limit to the application of this material for building purposes, nor any place where natural stone is now employed where it may not be substituted with advantage and economy."

H.

[1] For a full description of this building see the *American Architect* for August 17, 1877.

BUILDERS' SCAFFOLDING. — X.

IN considering the force of the action of waves or water currents on the standards or columns of staging, false-works of jetties, etc., alluded to in the January, 1883, paper, it is desirable to have some data of the extreme mechanical effect of sea-coast waves impinging against a vertical plane surface perpendicular to the direction of the waves' motion. The force of sea waves depends on their height, which in turn depends on their "fetch," or distance of their origin, and on the depth of water, as well, of course, as the actuating causes. Thomas Stevenson gives the result of experimental observations made on the west coast of Ireland, of which the following is an extract: —

Force in lbs. per sq. foot, perpendicular,	611,	Summer	2086,	Winter	6083	In storms.
Depth of water in ft., where observation made	9.8,	average	33,	average	97	

Bracing should not be affixed to standards of iron, where permanently under water, because of the rapid corrosion of joints and the impossibility of necessary occasional inspection, repairs, and re-adjustment; indeed, iron is entirely unfitted for such a position, as it would ordinarily corrode in a very short time and greatly reduce its initial strength, and cast-iron is further peculiarly debarred from use in such a situation by its inability to resist the impact of violent wave-shocks: wood suitably selected has advantages in these respects over iron.

As it is inopportune at the present stage to consider the subject of bending moments on columns, etc., we may, in the meantime, make a few observations tending to show that an intelligent application of most of the formulæ is essential to their safe employment in the varying circumstances which are inseparable from practice, and consequently that a thorough understanding of the theoretical conditions or assumptions on which formulæ are based is of vital consequence; thus, for instance, with regard to the common theory of *bending* it may be mentioned that it assumes that the material is so homogeneous throughout every particle of its composition, and in the cohesion between contiguous individual particles, that every imaginable transverse section through the structure, and which is conceived to be

perfectly flat previous to the creation of this bending stress, *remains* mathematically flat when that stress is applied, and hence when the conditions in practice do not correspond with, or in many cases do not even approach to, those assumed in theory, there must be a corresponding departure of the practical from the exact theoretical results.

Again it is assumed that the modulus of elasticity is the same for all degrees of stress, both in compression and tension, but this is not exactly realized in practice.

It may also be observed that there is a vicious popular misapprehension with regard to the theory of the factor of safety, which in many instances lends itself to the enforcing of designs of structures, which imperfectly correspond with the theoretically assumed units of strength of perfect specimens of materials which are tested under more favorable conditions than are usual in practical strains; assuming that a compound structure liable to so many undetected present and prospective accidental weaknesses, both in material and workmanship, is in all particulars equal throughout in strength to such unit measure.

It is self-evident that none of these assumptions are completely realized in practice, and hence the necessity of realizing these departures, in their absolute mechanical values in practical results, and of the ability to apply the necessary corrections in the elements of the design to the extent of their realization in any given case. It is this ability which exercises the really practical skill of the engineer, architect and contractor. Many of the elementary text-books are at fault in not sufficiently recognizing or denoting these several discrepancies in the practical application of mathematical formulæ. It is much to be feared that in the designs of many bridge and other structures which have conspicuously failed, these facts have not been sufficiently appreciated.

Assuming that an arrangement of bracing, as for instance that in a composite standard or "cage," on which the Scotch swing-derrick-crane is usually mounted to the requisite height to command the prospective building, or the *sapine* of the French scaffolding previously described, or the hoist-cage guide used sometimes for raising the materials for building church-towers, etc., to be such that the number of its parts is only sufficient to keep it in its normal shape when distorting forces are applied, it would then be non-redundant, as previously explained, in which condition the stresses are readily found directly. Thus for each diagonal brace or *link* it would be merely equivalent to the whole horizontal wind-force pressing on that portion of the structure which lies *above* such diagonal, divided by the sine (see Appendix) of the angle of inclination of the diagonal to the vertical, *i. e.*:

$$\frac{\text{Wind-force above diagonal}}{\text{Sine of angle of its inclination}} = \text{pull or push exerted through base.}$$

For each horizontal bar, the wind-force would be taken the same as for the diagonal, but in this case the divisor would be unity, because the angle is 90°, the sine of which is equal to radius = 1.

The *length* of an oblique brace is $= \frac{\text{Distance between standards}}{\text{Cosine of angle with the vertical}}$

An angle of 45° would be the most economical so far as the mere brace is concerned, but it would necessitate a greater number of them in a given height in such a structure, with a corresponding increased reduplication of the horizontal bars. The greater the angle that the brace makes with the vertical, the wider apart must be the columns or standards of a skeleton pier, etc., for the same vertical height, requiring a larger cross-section to resist the bending moment of the same compressive strain; but, on the other hand, the less is the stress on the greater angle-brace which the same intensity of horizontal strain produces. There is the greater need of care the wider apart the standards so braced, and the larger the proportions of the structure.

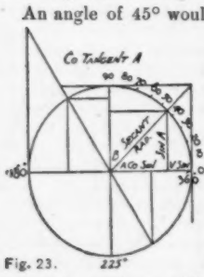


Fig. 23.

APPENDIX.

In order that the reader unacquainted with trigonometry may not be deterred from perusing this paper or the previous one, by the appearance of trigonometrical notation symbols, we may in the meantime, before formally considering the notation, etc., merely explain the normal position of the functional lines (which represent ratios, as explained in the foot-note) here used by means of the diagram, Figure 23. It will be observed that the circle is divided by two diametrical lines perpendicular to each other into four equal arcs called quadrants, each of which represents an angle at the centre of the circle, *i. e.*, at the intersection of the two diameters (and lying between any two adjacent radii) of a right angle = 90°; the whole circle containing 90° × 4 = 360°, each of which is divided into 60 minutes, and subdivided into 60 seconds. Of the two oblique radial lines, the one to the right is the *secant* of an angle of 45° A, from centre of circle to point of intersection of the perpendicular drawn from right extremity of radius. This perpendicular is the *tangent* of angle A. That to the left is similarly the *secant* of an angle of 60°. It is here drawn on left side of diagram to avoid confusion of lines. The vertical line drawn from the intersection of the secant with right-hand quadrant of circle, to the radius, is the sine of its opposite angle, A, and the portion of the radius between centre of circle and the sine is the cosine of angle A.[2]

[1] The reader unacquainted with trigonometry need not be repelled by the symbols sine, cosine, tangent, secant, etc., as he can nevertheless use them to advantage, because all that they indicate here are functions of the angle of inclination of the diagonal, etc., which are convenient decimal ratios which the several sides of any right-angled triangle bear to one side, which is known, and is assumed as *radius* = 1, in order to facilitate arithmetical calculations involved in the solution of such problems. He has only to refer to a table of *natural* sines, cosines, etc., in any of the numerous engineering hand-books, and find the required angle: when it is less than 45°, the symbol or heading is at *top* of page; but if above 45°, the symbol is at *foot* of page, and the columns are read upwards in the latter case; thus, if the above angle were 30°, the sine value is found under heading at top of page to be .500, *i. e.* = a half of radius. In the last paper we used the ratio 1.4142 to find the length of the diagonal of a square whose side is unity = 1. Now we will find in the same *natural* tables that this is the *secant* of an angle of 45°, and therefore forms the hypothenuse of a right-angled triangle, whose base and vertical are each = 1; *i. e.*, the half of a square; the trigonometric representative of the base in this case being the *radius*, and of the vertical being the *tangent*. If hypothenuse be assumed as radius, the other two sides become the sines of *their* opposite angles.

MACHINE-SHOP FLOORS.

THE following extracts from the specification for a Crane Shop to be built for the Yale Manufacturing Company at Stamford, Conn., may be of service to those who may have to build similar buildings for heavy manufacturing purposes.

Floors.—That the whole interior of the Crane Shop shall be floored in the manner indicated on the detail drawings; that preparatory to this all soil or loam shall be removed from the interior of the building, and its whole surface graded to a proper level with clean gravel, stone or ashes, which shall be rolled or otherwise packed until thoroughly hard and solid; that a series of 2½ x 4 inch stakes shall be driven into this gravel in regular lines as per detail drawing, each stake to be driven down to a solid bed, or not less than 30 inches, and that nailing strips, fitted and well nailed to these stakes, shall then be laid and carefully levelled to the proper height so as to insure the proper support and perfect levelling of the whole floor; that on top of the gravel bed, and between and under these nailing strips, there shall be laid a course of concrete not less than 8 inches thick, consisting of clean cobbles averaging about 2 inches in diameter, well coated with coal-tar or bitumen, and laid in place while the latter is soft and then solidified and packed together by being rolled and tamped, the upper surface of the concrete course to consist of a thin covering of tarred sand or fine gravel, filling the interstices of the cobbles and thus forming a smooth, hard surface, flush with the top of the nailing strips; that on the top of this shall be laid the first course of wood, consisting of two-inch plank, not exceeding 7 inches in width, tongued and grooved together, or grooved on both edges and fitted with hard-pine splines measuring ⅞ x 1¼ inches, these planks to be mill-worked to uniform thickness, and laid with the surfaced side up, each plank to be fastened with two forty-penny nails at each intersection with the nailing strips and all butts to be made on a nailing strip; that on the top of this floor the Contractor shall lay a course of building paper (the paper to be furnished by the Company) and over this a course of yellow or hard pine flooring, 1¼ inches thick, the strips not to exceed four inches in width, and to have standing or straight edges (without tongue and groove) and to be mill-worked to uniform thickness, the surfaced side laid up, each strip to be fastened to the under floor, by two ten-penny finishing nails in each 16 inches of length, these nails to be well set, so as to stand at least one-quarter inch below surface of floor, the floor to be carefully fitted and well secured around all piers, and against all walls. Openings to be left in this floor around foundations for heavy machines as the Company may direct, an abatement of 20 cents per square foot to be allowed by the Contractor to the Company for the floor-surface thus exempted from covering. Two car tracks to be laid, one lengthwise of the building and the other transversely, each to extend from wall to wall; the timber for these tracks to be the size shown by the drawing, and laid as therein indicated, this to be done prior to laying the concrete, which latter shall be carefully laid and rammed around, between and under the timbering for tracks the same as elsewhere, the Company to furnish the rails and spikes for the tracks, and the Contractor to lay and fasten the same in place, commencing at the door-sills and completing the tracks within the building, excepting the turn-table at their intersection, which latter shall be furnished and set in place by the Company.

That the floor of wash-room in Crane Shop shall be built as per detail drawing, the under side of floor and timbers to be finished in the same manner as specified for the interior of roof; that the floor proper shall consist of two-inch spruce plank laid on the timbers, and above this a floor of one and one-quarter inch hard-pine, with building paper between, the width of floor-plank, mode of nailing, finish, etc., all to correspond with the specification for the main floor of the building; that the Contractor's work on wash-room shall terminate with the floor and stairs leading thereto, including the hand-rail around the same, and that the company will do all further fitting up of wash-room.

That the floor of Smith Shop shall be made as follows: All soil or loam to be removed from the building and the whole surface to be then levelled up to the proper height with clean gravel, sand or ashes, well

[2] The foregoing, in connection with the foot-note above referred to, will probably suffice for the present.

rammed and packed where necessary; that on top of this shall be laid a course, not less than six inches thick, of sand and clay well mixed together with water, in such manner and proportions as to properly harden, and then spread in place and there puddled, tamped and rolled to the proper grade and perfectly level, so as to form a smooth hard clay floor over the entire building; that prior to laying this floor the Contractor shall lay the timbering for carrying the track transversely across the Smith Shop, as per drawings, and lay the rails which shall be furnished by the company. That the space between these tracks, and also a width of twelve inches outside of each rail, shall be covered with four-inch spruce plank well spiked to the cross-ties and laid so that the upper surface is flush with the top of rails, the clay floor to stop against this plank on each side of the track.

THE $3,000-HOUSE COMPETITION. — VIII.

DESIGN SUBMITTED BY "*Bboul.*"

AS a prefatory remark, it is but just to say that although this house *could* be built in certain localities for $3,000, still, to a man answering the conditions of the problem, the situation would be of great importance, and therefore "*Bboul*" thinks it advisable to place the unfortunate man either in Brookline, Longwood, or Jamaica Plain, rather than in any of the towns north of Boston, where undoubtedly estimates would be from twenty to thirty per cent less.

OUTLINE SPECIFICATIONS.

Foundation Walls:—18-inch rubble to grade; 8-inch brick wall to sill.

Scantlings: — Sill, 6″ x 6″; outside studs, 2″ x 4″; inside studs, 3″ x 4″; joists, 2″ x 9″ and 2″ x 8″, and 2″ x 7″ respectively, for first, second and third floors; rafters, 2″ x 6″.

Boarding: — (Rough) hemlock.

Plastering: — Two-coat work; no back plastering.

Balloon Frame.

Windows: — Ready-made sizes.

Doors: — Factory-make, 1½″ thick.

Shingles to be perfectly plain, neither stained nor painted.

Clapboarding: — Below second-floor joists, to be painted.

Felting-Paper between rough boarding and clapboards and finished flooring.

Chimneys: — 4-inch walls; 8″ x 8″ flues.

Plumbing: — Tub, water-closet and bowl in Bath-room; sink in Kitchen; hopper in basement, and two set tubs.

Cellar concreted.

Trunk-room in attic, unfinished.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR BOSTON, MASS.

200 cubic yards excavation,	@ $ 0.25 per yd.		$ 50.00
50 perch stone,	" 3.75 " perch		187.50
9000 brick,	" 20.00 " M.		180.00
655 sq. yds. lath and plastering,	" 0.20 " yd.		131.00
15000 " ft. of lumber and rough flooring,	" 17.00 " M.		255.00
1750 " " upper-boarding,	" 25.00 " "		43.75
23 windows, including fixtures,	" 5.00 " wind.		115.00
23 doors " "	" 6.50 " door		149.50
18500 shingles,	" 4.75 " M.		87.87
1500 clapboards,	" 28.00 " "		42.00
Plumbing			200.00
Painting			125.00
Stairs			125.00
Furnace			150.00
Labor			500.00
70 feet gutters,	" $0.12 per ft.		8.40
50 " conductors,	" 0.10 " "		5.00
8 kegs nails,	" 4.00 " keg		32.00
Hardware-fixtures			10.00
Fireplaces, including mantels (two)			50.00
			$2,547.02
Contractor's profit, say	10 per cent	$254.00	
Architect's commission,	5 "	125.00	
Leaving for extras,		74.00	
			453.00
			$3,000.02

N. B. By a little closer figuring the estimate might *possibly* be brought down to $3,000.

DESIGN SUBMITTED BY "*Spring Chicken.*"

Excavation and Masonry: — The Cellar to be excavated 6 feet below grade line. A cesspool 100 feet from house. The foundation-walls to be of good local stone, laid on flat beds; face pointed above ground and inside dashed up. Piers of porch and chimney, of stone.

Brickwork: — Brickwork of good sound brick, run of kiln. Chimney topped-out with dark stretchers, with black mortar. Fireplaces in Hall and Dining-room of pressed-brick.

Carpenter-Work. — A balloon frame sheathed with 1-inch hemlock; a layer of paper-felt next the sheathing, and the whole covered with California red-wood shingles. All lumber for frame, joists, etc., to be of hemlock. All mill-work and joinery, exterior and interior, to be of good white-pine, for painting. All flooring and stair-steps to be of yellow-pine. Hardware plain and substantial.

Plastering: — The whole interior to be plastered with good two-coat work.

Tinning:—Valleys, gutters and conductors of best IC charcoal tin.

Painting: — All interior wood-work, and all exterior except shingles, to be painted with three coats of best white-lead linseed-oil paint. The shingles to be coated with crude petroleum.

Plumbing: — A drive-well 20 feet deep under Kitchen, with an iron force-pump supplying, by a ½-inch lead pipe, a 500-gallon round cedar tank in the third story. From tank ¾-inch supply to be carried to bath-tub, water-closet, boiler and sink. A ½-inch supply hot water to bath and sink, with the requisite fittings and traps, all to drain into a 4-inch iron soil-pipe, run out at roof, and connected outside with terra-cotta drain to cesspool.

Heating, etc.: — A good portable heater in Cellar, with requisite tin flues to distribute heat as indicated to first and second stories. A small, single-oven range in Kitchen, with water-back, etc.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR PHILADELPHIA.

MASONRY, EXCAVATION, ETC.

540 cub. yds. excavation,	@ $ .23 cts. per yd.,		$124.20	
50 ft. terra-cotta drain-pipe,	" .30 " ft.,		15.00	
67 perches stone-work,	" 2.75 " perch,		184.25	
				$323.45

BRICKWORK.

13500 bricks,	@ 8.00 per M.,		$108.00	
Laying same,	" 4.00 "		54.00	
500 pressed-brick,	" 20.00 "		10.00	
Laying same, (two fireplaces)			10.00	
35 ft. terra-cotta pipe in chimney, and 3 sleeves,	" .20 per ft.		7.60	
				189.60

CARPENTER-WORK, LUMBER, AND HARDWARE.

2500 ft. hemlock joists,	@ 14.50 per M.,		$ 36.25	
4500 " studs and rafters,	" " "		65.25	
3500 " boards,	" 15.00 "		52.50	
2250 ft. yellow-pine flooring,	" 27.00 "		60.75	
13250 shingles,	" 14.00 "		185.50	
40 squares rosin-sized roofing-felt,	" .40 per square,		16.00	
4 cellar window f'm's with glazed sash,	" 1.50 " window,		6.00	
12 window frames with glazed sash,	" 3.50 " "		42.00	
12 " " " "	" 3.00 " "		36.00	
10 pairs outside shutters,	" 2.00 " "		20.00	
3 " inside "	" " " "		6.00	
500 ft. cornice moulding,	" .06 " ft.		30.00	
350 " bracket, porch-posts and plates, barge-boards, etc.,	" .05 "		17.50	
Front door and frame			3.75	
Vestibule door			2.40	
Kitchen door and frame			3.75	
19 interior doors,	@ 1.60 per door		30.40	
Door casings			10.00	
" trimming			33.00	
200 ft. window trimming,	@ .05 per ft.		10.00	
18 pairs jap. iron butts,	" .20 " pair		3.60	
3 " "	" .25 "		.75	
10 jap. iron locks with knobs,	" .30 each,		3.00	
4 " " "	" .20 "		.80	
4 mortise " "	" .75 "		3.00	
1 front-door lock, complete			2.00	
1 rim lock			.35	
1 doz. Morris sash-locks			1.50	
Shutter-rings and staples			1.00	
1 doz. hand-rail braces			1.10	
10 galv. iron outside shutter-bars,	@ .25 each,		2.50	
10 " turn-buckles,	" .16 per pair,		1.60	
6 doz. hat and coat hooks,	" .12 " doz.		.72	
1 " cupboard-catches			.80	
Inside shutter-fittings and hinges			1.00	
Drawer-pulls, bolts, and sundries			2.00	
50 lbs. 20 *d.* nails,	@ .03½ per lb.,	1.75		
350 " 10 "	" " "	12.25		
150 " 8 "	" .03¾ "	5.62		
300 " 6 "	" .04 "	12.00		
				31.62
240 " sash-weights,	" .01½ "		3.60	
180 ft. yellow-pine for stair,	" 35.00 per M.,		6.30	
Ash hand-rail			10.00	
500 ft. white-pine shelving,	@ 40.00 per M.,		20.00	
20 lbs. sash-cord,	" .50		10.00	
250 days' carpenter-work,	" 2.50		625.00	
				1,399.29

PAINTING.

Painting all wood-work, inside and out, and coating shingles with crude petroleum		140.00

TIN-WORK.

150 ft. valleys and flashing,	@ .03 per ft.	4.50		
130 " gutter,	" .20 "	26.00		
150 " rain-pipe,	" .15 "	22.50		
				53.00

PLUMBING.

Drive-well 20 ft. deep			40.00	
Lift and force-pump			10.00	
500 gal. tank			25.00	
50 ft. ¾ inch. A. A. lead pipe,	@ .30 per ft.		15.00	
30 " ½ " "	" .20 "		6.00	
30 " 1¼ C lead pipe,	" .20 "		6.00	
4 ½ inch. brass composition cocks			14.00	
1 copper bath-tub			14.00	
1 pan closet			10.00	
1 galvanized-iron sink, 18″ x 24″			4.50	
1 " boiler, 30 gal.			19.00	
50 ft. 4 inch. cast-iron soil-pipe,	@ .30 per ft.		15.00	
Trap and connections			6.00	
Lead, traps, couplings, etc.			4.50	
Plumbing-work, 6 days,	@ 4.00 per day,		24.00	
Helper,	" 2.00 "		12.00	
				225.00

HEATING.

Heater			40.00
40 ft. round tin-pipe,	@ .50 per ft.		20.00
50 " 4″ x 12″ wire-lath,	" .60 "		30.00
6 registers,	" 2.00 per register,		12.00

Single-oven range, with water-back			$50.00	
Setting above work, 4 days,	@	4.00 per day	16.00	
				$ 168.00
				$2,498.34
Builder's profit,	"	.08 per cent,		199.84
				$2,698.18
Architect's commission.	"	.05 " "		134.96
				$2,833.14

THE ILLUSTRATIONS.

HOUSE OF A. T. LYMAN, ESQ., WALTHAM, MASS. MESSRS. HARTWELL AND RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE original house upon this site was built nearly one hundred years ago, having been added to and built upon at various times since until it reached nearly to the dimensions of the present building. Further changes being desired and examination having shown extensive repairs to be necessary, it was decided to rebuild upon the original spot, retaining certain rooms in their old places and so far as might be preserving the character of the old work. The result is a new building similar in the general disposition of its parts to the old, but higher, and deeper, with bay-windows, porch and staircase which had no counterparts in the original, and with much added internal accommodation. The pilasters upon the front of the second story of the bay windows, (some of which also appear upon the garden front) are relics from the original building. A few old bits of interior detail are also preserved, but with these exceptions, everything which appears is new work.

GRAMMAR SCHOOL-HOUSE, STEELTON, PA. MR. GEORGE A. CLOUGH, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGNS FOR A $3,000-HOUSE SUBMITTED BY "*Bboul*" AND "*Spring Chicken.*"

SHOULD any of our non-professional readers desire to build according to either of these designs, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

"'*Bboul's*' plan is remarkably like that of '*Bumpkin*,' but suffers by comparison with it. The dining-room and parlor do not communicate as those of the latter do, and upstairs the chambers are too isolated, and there are no back stairs. Nevertheless, the plan is one of the best presented for a dwelling for all the year round. The attic is well utilized, and the basement fitted up for a laundry and water-closet. '*Bumpkin*' has worked-in four rooms at a little additional cost, and '*Bboul*' could probably do the same if desired. Of the elevation nothing but praise need be said. An almost quaker-like simplicity, combined with a bold accentuation of the sky-line, gives at once a refined distinction to the design, which gains much also from its excellent proportions, and from the well-balanced relation and distribution of the window openings. From the economical side this design offers a reliable solution of the problem, and could be carried out with every indication of the owner's ultimate satisfaction. The drawings are neat and pains-taking, yet with no lack of artistic sentiment. This careful drawing from a skilled hand is a pleasing contrast to the wanton neglect shown too often by facile and brilliant draughtsmen.

"'*Spring Chicken.*' Very good scheme; simple and economical in plan, and the exterior judiciously treated. The parlor and dining-room and kitchen grouped about the same chimney, which, however, is not made use of in the second story. The dining-room can only be reached through the parlor, which defect is mitigated by communication from kitchen to front-hall. Back stairs done away with by using the front flight, which thus cannot be left with an open balustrade into hall, but ascends between solid walls. Bedrooms well arranged, and bath-room placed properly over kitchen. Closets too large for size of house. The attic stairs, chambers, and tank disposed so that not a foot is wasted. The details are good and the drawing crisp, with, however, a dangerous tendency towards coarseness. To sum up, a capital solution of the problem from the most economical point of view."— *Extract from the Jury's Report.*

BUILDING SUPERINTENDENCE. — XXVIII.

WE now know the necessary sizes of timbers, and form of piers and buttresses, for carrying out our provisional sketch of the building into definite drawings, and we proceed to lay out our floor-plans and elevations, continuing, after these are well studied, to construct a foundation-plan in accordance with them. The elevation may be first taken up, as upon this will in a great degree depend the details of the completed plan.

We have seen, from the investigation just made, that the walls of the central portion of the building, which supports a hammer-beam roof, will need to be buttressed, to support the tendency of the roof to spread, while those of the portions containing the stage and gallery, being covered by roofs which are tied at the feet of the rafters, and therefore have no lateral pressure, do not require buttresses. Our calculations have shown that buttresses two feet wide on the face, and projecting 20 inches, will fulfil the conditions of stability, but if the effect or the proportion should require it, we need not hesitate to vary from these dimensions, only assuring ourselves, in case of doubt, that the new form will be equally suited to resist the thrust of the roof. The projection of the buttresses on the middle portion of the façade will give it a marked character, heightened by the long side windows of the central hall, which are not needed, and are rather in the way, in the stage and gallery portions; and to differentiate still further the middle of the building from the ends, we will carry up a low parapet over the windows of the hall, behind which a wide and deep gutter can be formed to keep the drip from the eaves away from the central doorway. The corresponding portion of the ridge may also be distinguished by a cresting of metal or terra-cotta, and the three-fold division of the interior thus "accused" upon the exterior, without interrupting the uniformity of the roof-surfaces which we think desirable.

The buttresses of the middle portion of the walls must obviously be supported from below, and will appear in the first story as piers. The curtain wall which connects them in the second story need not, however, be prolonged to the ground, if there is any other way of supporting it, but may have its position transposed in the first story, if we desire. As some of the smaller offices in the first story and basement occupy but one bay of the façade, we can save twenty inches of room in them, besides improving the effect of the front, without adding to its cost by adopting this disposition, and transferring the curtain wall, or "wall-veil," as some persons prefer to say, in the first story, to the exterior instead of the interior line of the buttresses. This will take away the support from beneath the small portions of the upper wall between the buttresses and the window openings, and under the windows themselves, so we will have flat segmental arches turned in those places, which will show just under the ceilings of the first-story rooms, but will be out of the way. The interval which will be left between the top of the first-story wall and the sills of the second-story windows we will treat as series of small balconies, accessible from the windows, with stone floors, and a parapet wall. This balcony wall will stop at one end against the staircase tower, and may be prolonged at the other end so as to form a kind of shallow porch over the side doorway, with a narrow balcony on top, furnished with a door opening from the room under the gallery; all of which will help to break up and make interesting a front otherwise rather monotonous.

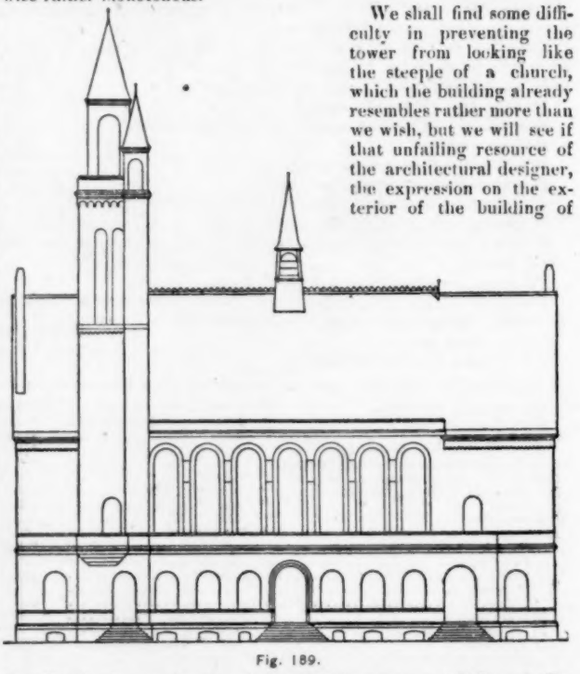


Fig. 189.

We shall find some difficulty in preventing the tower from looking like the steeple of a church, which the building already resembles rather more than we wish, but we will see if that unfailing resource of the architectural designer, the expression on the exterior of the building of the distribution and uses of the interior, may not help us. Remembering that a portion of the tower, which contains the staircase leading to all the upper portions of the building, must be reserved as a ventilating shaft, to carry the foul air from the different portions of the building, we will "accuse" the shaft by making it project four inches from the general surface of the tower wall, above the first story, and will give it a special termination at the top. We shall need, for the best results, a shaft of something like sixty square feet sectional area, and this can be obtained in the manner indicated.

The offset of four inches which would naturally be made in the tower wall about at the second-story floor we will make on the outside, instead of the inside, thus giving it an air of greater apparent stability by the enlargement of the base. The outside of the wall of the ventilating shaft may be made continuous with that below, while the change in thickness of the other portion may be emphasized by placing at that point a balcony, supported by stone corbelling, which will serve to shelter the stage entrance to the hall, and will always be useful, at times of public demonstrations, to the guests of the town officers, who will obtain access to it by a door. The top of the tower would naturally be used to some extent as a lookout, and a bell would probably be hung there, so that the flat platform with

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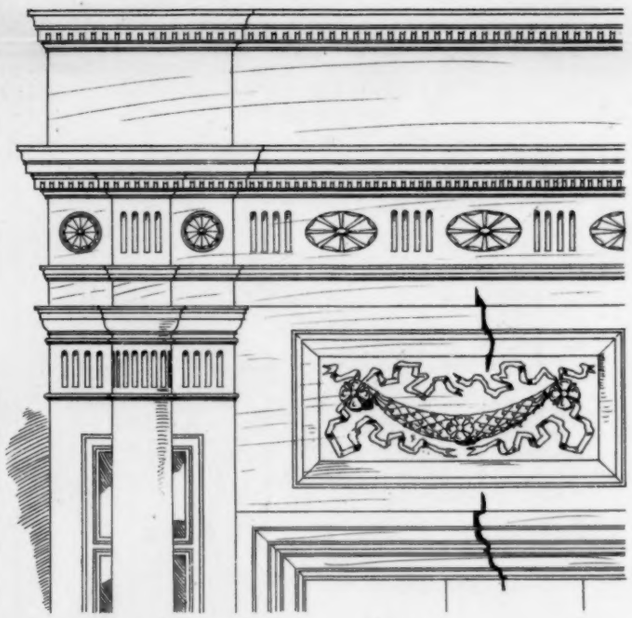
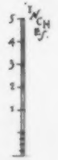
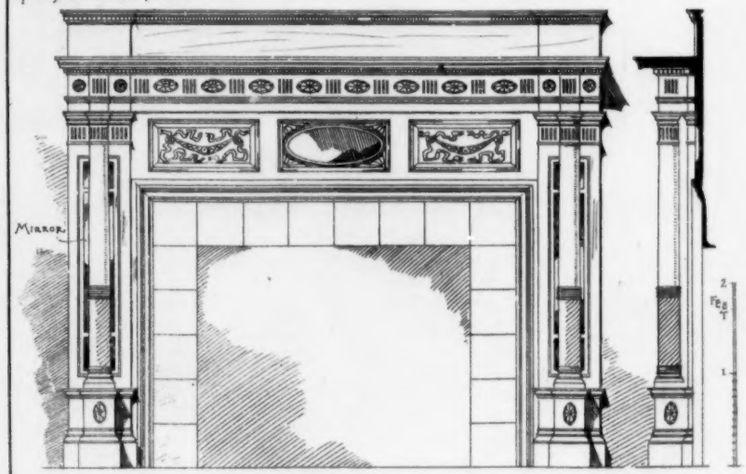


Bow Parlor Mantel. Details.

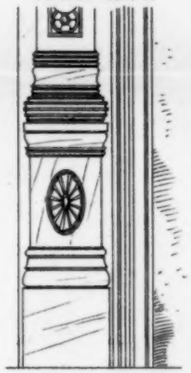
Mirrors behind Columns.

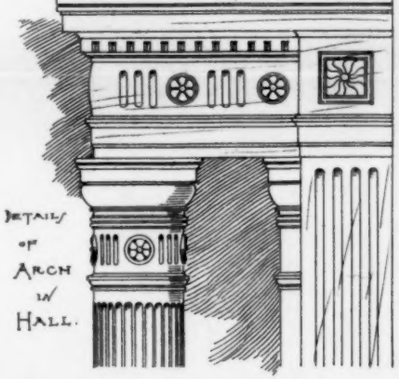


Finished in White and Gold.



Bow Parlor Mantel. Section





Details of Arch in Hall.

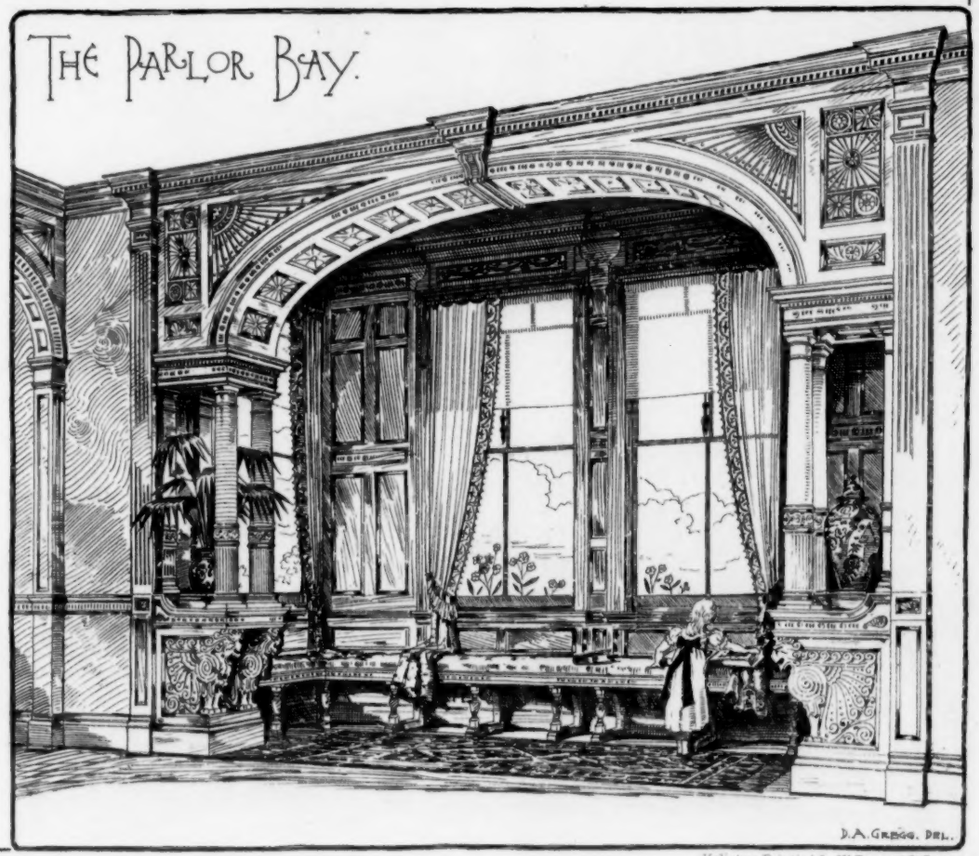
House of A. T. Lyman Esq.re

Waltham. Mass.

Messrs. Hartwell & Richardson.

Architects. Boston. Mass.

The Parlor Bay.



D. A. Gregg. Del.

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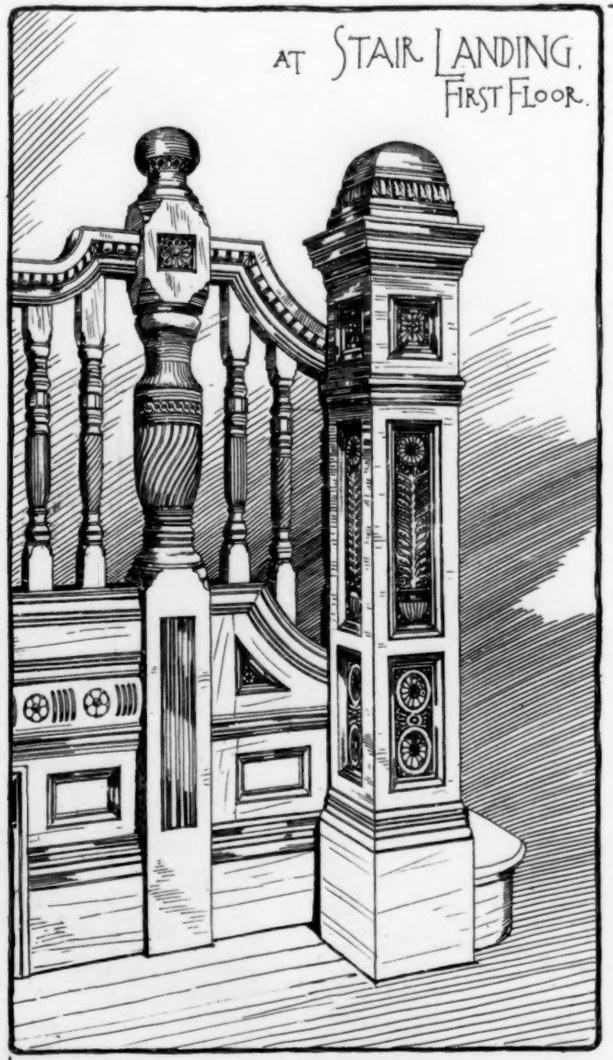
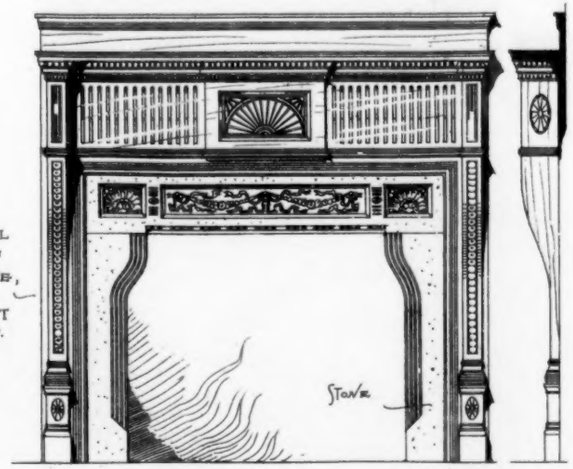
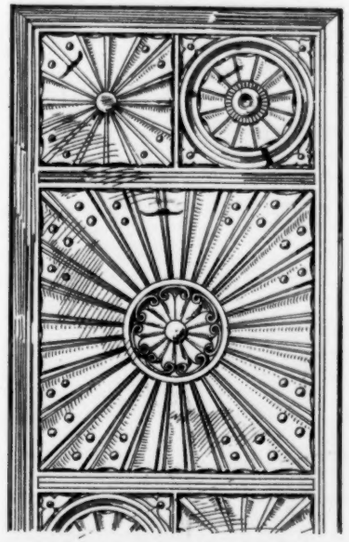


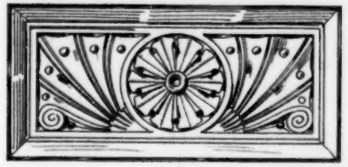
AT STAIR LANDING, FIRST FLOOR.

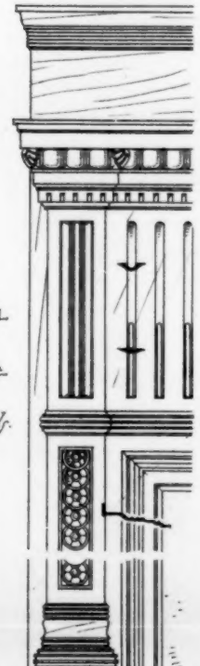


MANTEL IN ALCOVE, FIRST STORY.

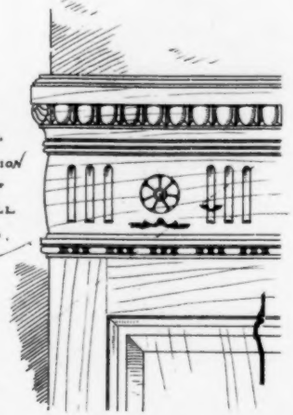


CARVED PANELS IN PARLOR BAY ARCH.



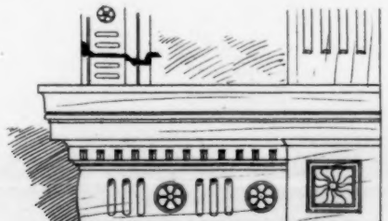


MANTEL IN ALCOVE. Details.



UPPER PORTION OF HALL DADO.

IN HALL, LOOKING THROUGH CORRIDOR TOWARDS LIBRARY.



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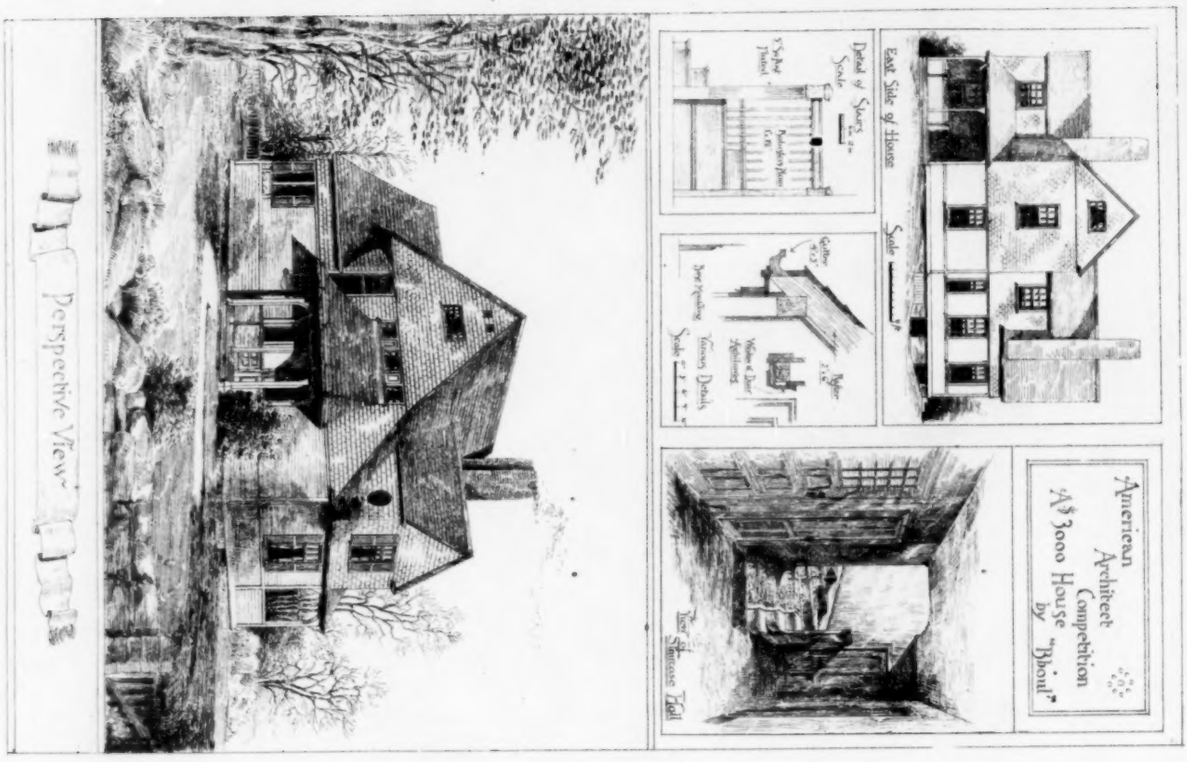

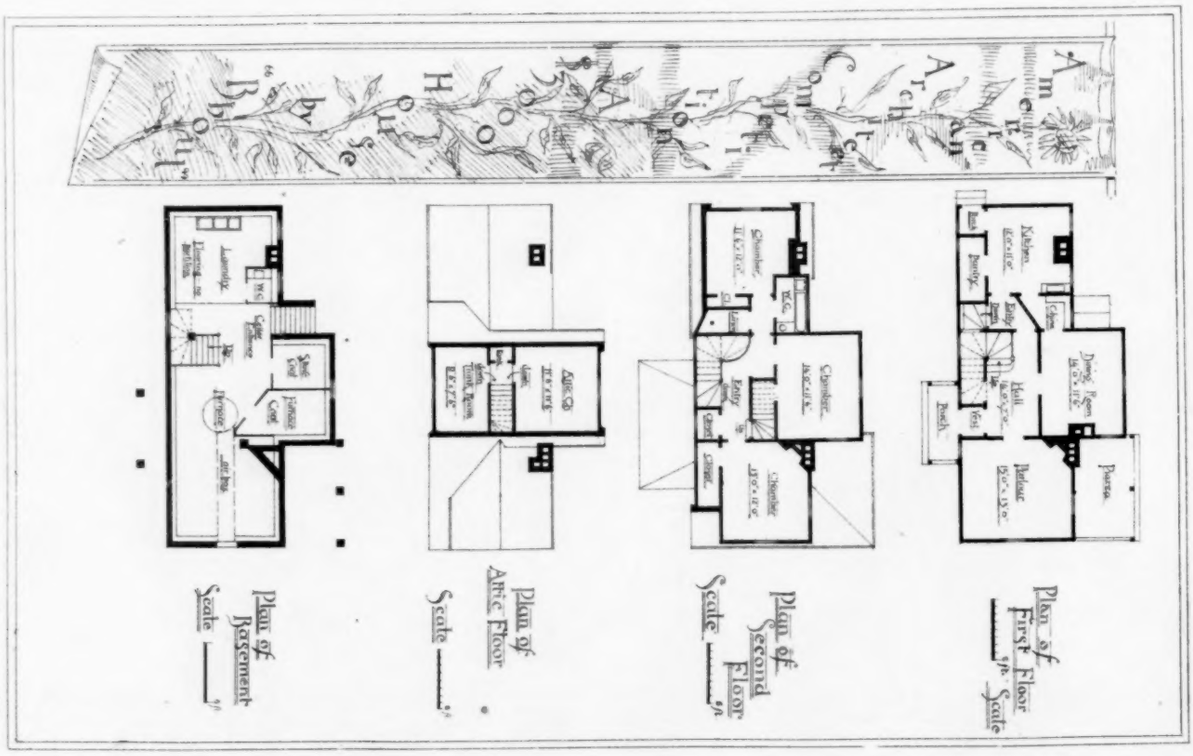

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GRAMMAR SCHOOL HOUSE — STEELTON, PA

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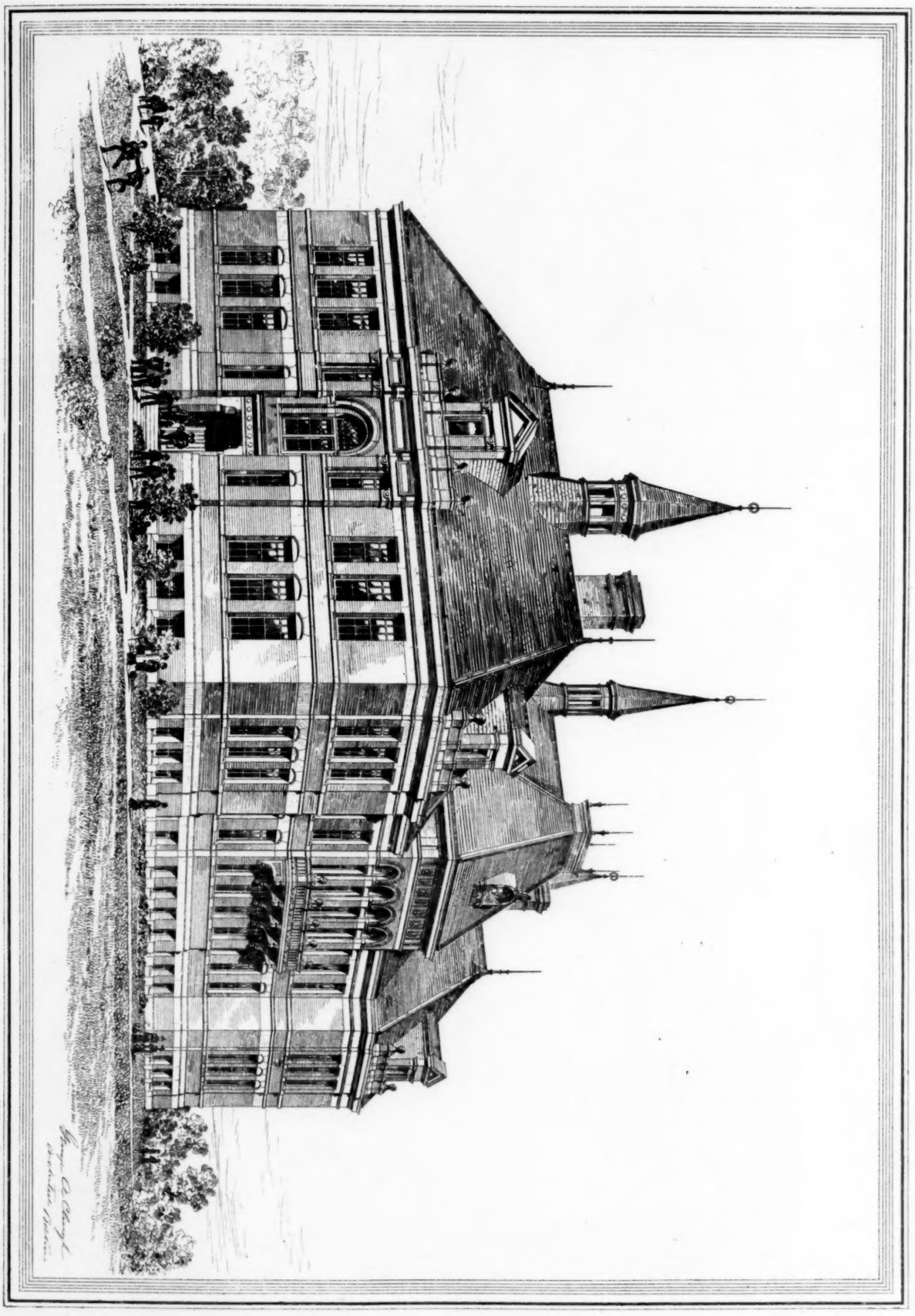

GRAMMAR SCHOOL HOUSE—STELTON, PA

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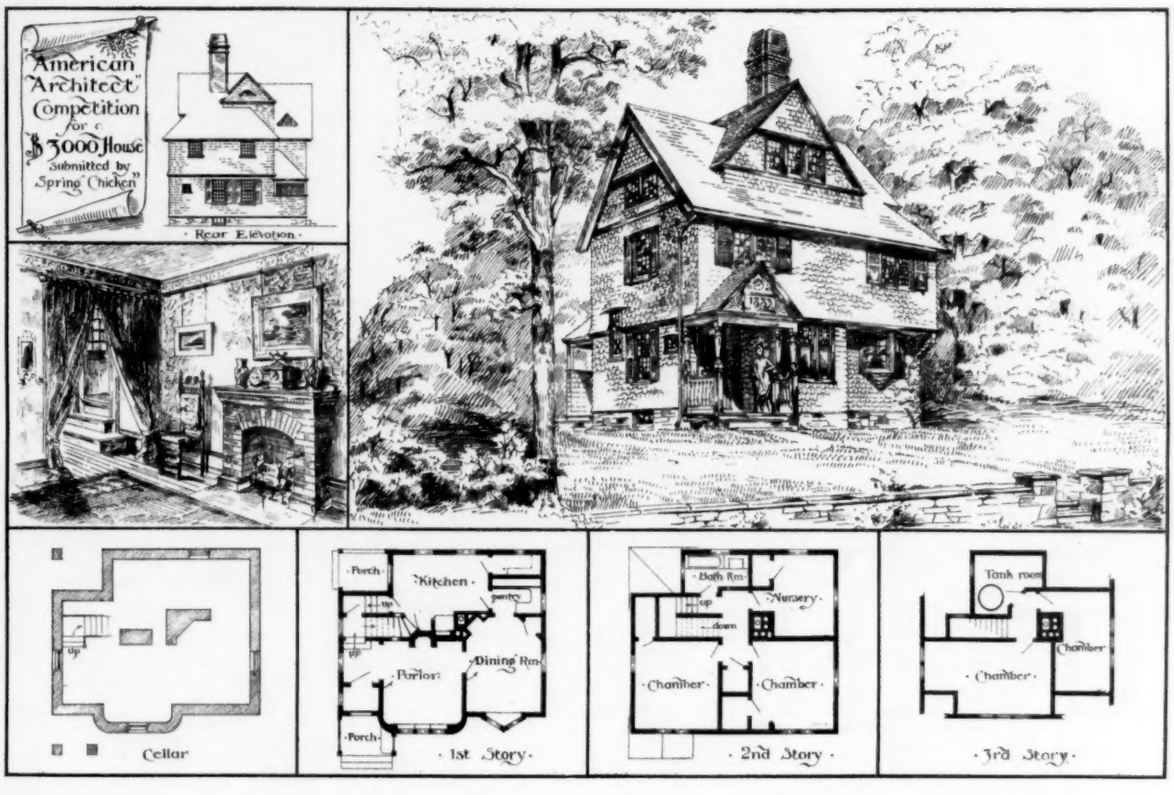
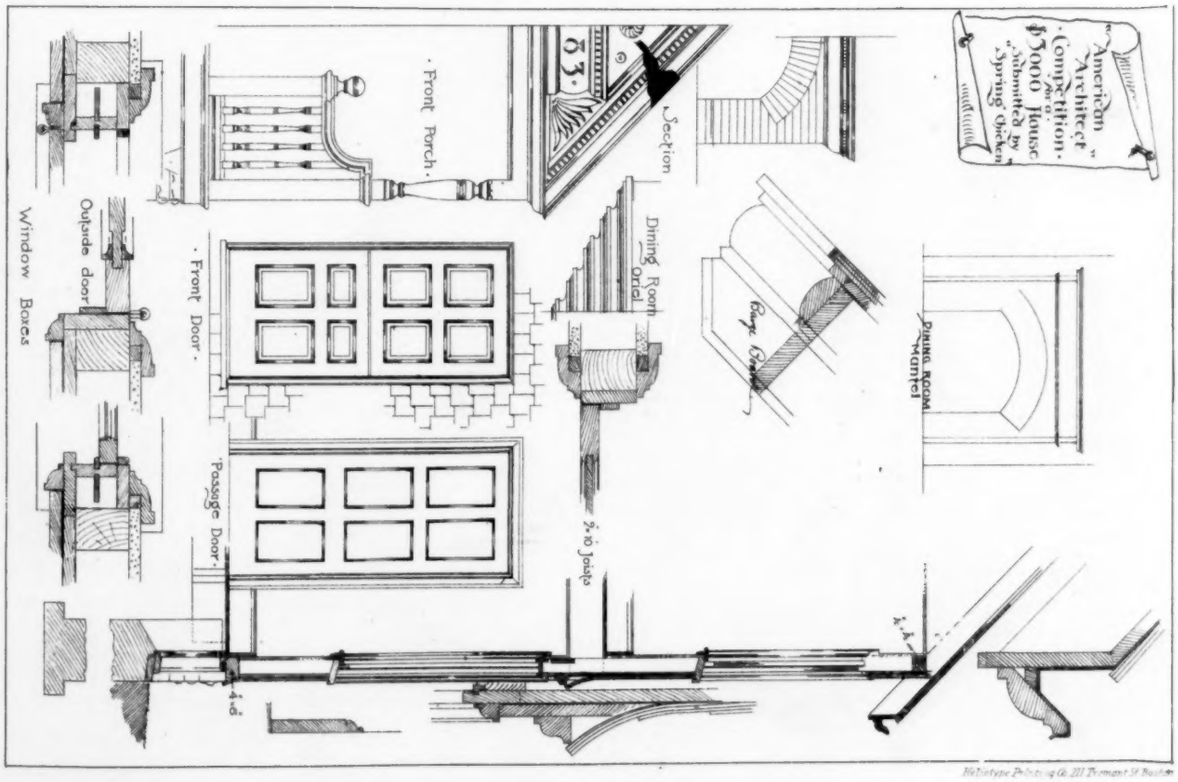




parapet, and wooden belfry a little in retreat, will serve both purposes. To complete the exterior features we should add a ventilating turret over the middle of the roof, which will be indispensable in hot weather, to withdraw rapidly the air just under the roofing, which is intensely heated by the sun on the slates, before it can diffuse itself into the atmosphere below, and two chimneys will be necessary, which can conveniently be placed in the walls of the end gables.

The elevation of the opposite side will be substantially the same as the front, with the exception of the tower and doorways, and the end walls will be pierced only with a few windows.

Before we can fix the weights upon the different portions of the foundation, which will determine the spread of the footings and the number of piles under them, it will be necessary to fix definitely the thickness of the walls. For the front, since the piers between the windows are somewhat slender, we have already decided to make them 16 inches thick, adding the projection of the buttresses to this, and as this wall is well tied by the floor-beams which rest in it, the same thickness, 16 inches, will be sufficient for the portions at the ends, which have no buttresses.

The gable walls are under very different conditions, being much higher than the others. The lower portion, beneath the stage and gallery floors, is slightly steadied by the interior partition-walls, which are to be well anchored to it; but above this floor the wall stands free to the roof. As the roof cannot well be tied very strongly to the gable walls, it will be safest to regard these as unsupported above the ground floor, and to give them the thickness required for independent stability. This can be readily calculated by Rondelet's empirical rule. Laying off the height of the wall above the ground, at any scale upon a vertical line, we set off horizontally from the foot of the vertical, at the same scale, the distance between the cross-walls or other supports which bound the wall whose thickness we wish to determine. Connecting first the extremity of the horizontal line, by a diagonal, with the top of the vertical line, we then divide the vertical line into twelve equal parts, and, with one of these parts as a radius, describe an arc from the top of the vertical line, cutting the diagonal, and from the intersection of this arc with the diagonal let fall a second vertical line. The space between the two vertical lines, at the scale of the diagram, will represent the necessary thickness of the wall.

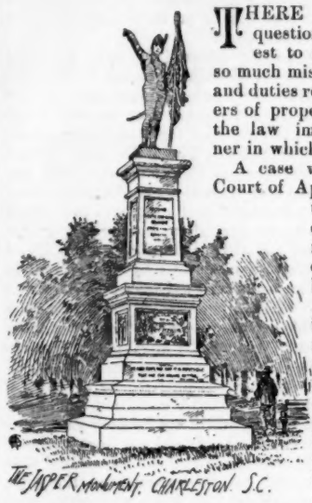
In our case the gable is 96 feet high from the second floor to the apex, and 70 feet wide between the supporting return-walls; and applying the rule we find the thickness necessary to stability to be about 4 feet.

It is obvious that although this may be the proper thickness of the wall at the foot, some economy may be made in the upper portion without diminishing the stability of the mass, since the lowering of the centre of gravity will compensate for the loss of weight. If the wall were rectangular, it might, by successive offsets, be reduced from four feet to sixteen, or even twelve inches, at the top, but the peak of a gable is less solid and steady than the corresponding portion of a rectangular wall, and we shall do best not to reduce it below twenty inches in thickness. It is quite possible that a smaller amount of material might be so distributed, by means of buttresses, as to give the stability needed, but this, we suppose, would involve in our case certain objectionable conditions, so we accept the result of our calculation, and draw the section of the wall in accordance with it, making the average thickness 34 inches. The tower walls are next to be considered. These are strongly held by the return walls, which tie it back in such a way that it would be almost impossible for them to fall over, so that it is hardly necessary to give them more than the thickness required for resisting the crushing strain due to their own weight. The walls being 134 feet high, the Rondelet diagram gives for them a thickness of 20 inches, which is unquestionably sufficient, but public opinion, for some reason, generally demands the thickest walls for towers, which need them least, and in deference to this, as expressed by our committee, we will make the lower portion 28 inches thick, diminishing the upper part by two offsets to 16 inches, as a compensation for the excess of material used below. This, while improving the appearance of the building, will really be judicious as a matter of construction, inasmuch as a solid brick wall 134 feet high, and 20 inches thick, although under the circumstances perfectly stable, would be subjected to a crushing strain at the base of 7½ tons to the square foot, which would be increased again upon the piers at either side of the doorway, by the arch, which throws upon them the weight of the mass above it, to about 12½ tons. To this weight again might be added a further strain due to the action of wind on one side or the other, amounting possibly to 10 or 12 tons more. This would give a stress which ordinary brickwork could not with perfect safety be trusted to bear, but the increase of the mass at the lower part of the tower, with the lightening of the upper walls, will relieve us of all anxiety upon this point.

The variations in the thickness of the masonry will be made at somewhat irregular heights, to suit the exigencies of the openings and the ventilating shaft, but a little study of the section will give us, we suppose, an average thickness of 22 inches.

The interior walls, with the exception of that forming the abutment, opposite the tower, of the proscenium arch, which will have the same thickness as the arch, are not of great height, and are steadied by the floor-beams, so that 12 inches will be sufficient for them.

ACTIONABLE NUISANCES.



THE JASPER MONUMENT, CHARLESTON S.C.

THERE are says "A Barrister," few questions of such importance and interest to the general public as to which so much misconception exists as the rights and duties respectively of neighboring owners of property, and the obligations which the law imposes with regard to the manner in which such property should be used.

A case was recently heard before the Court of Appeal, which forcibly illustrates the difficulties of attempting to define a man's duty towards a neighbor whose occupation or calling is absolutely incompatible with neighborly relations. A student would find it difficult, if not impossible, to devote his mind to study if his next-door neighbor should keep a printing-machine at work at all hours of the day or night. The physician, the surgeon, or the artist would find it equally impossible to pursue their avocations in a locality devoted to noisy trades. But it is evident that the same rule of reasoning could not be made to apply to Whitechapel as to Belgravia. What might be fairly considered the ordinary avocation of a man in Whitechapel could not be regarded as an ordinary incident of life in Belgravia. The same principle could not be applied with logical strictness to the two localities.

Lord Justice Thesiger has in fact insisted that the principle is the same, but its application should be controlled by the time and circumstances of the case. For instance, it would result in the most serious practical inconvenience if a man might go, say into the midst of the tanneries of Bermondsey, or into any other locality devoted to a particular trade or manufacture of a noisy or unsavory character, and by building a private residence on a vacant piece of land put a stop to such trade or manufacture altogether. The case is also put of a blacksmith's forge, built away from all habitations, but to which in the course of time habitations approach. Lord Justice Thesiger did not think that either of these cases presented any real difficulty. As regards the first, it may be answered that whether anything is a nuisance or not, is a question to be determined, not merely by an abstract consideration of the thing itself, but in reference to its circumstances. What would be a nuisance in Belgrave Square would not necessarily be so in Bermondsey, and where a locality is devoted to a particular trade or manufacture, carried on by the traders or manufacturers in a particular and established manner, judges and juries would be justified in finding, and may be trusted to find, that the trade or manufacture so carried on in that locality was not a private or actionable wrong. As regards the blacksmith's forge, it would be, on the one hand, in a very high degree unreasonable and undesirable that there should be a right of action for acts which are not, in the present condition of the adjoining land, and possibly never will be, any annoyance or inconvenience to either its owner or occupier; and it would be, on the other hand, in an equal degree unjust, and from a public point of view inexpedient, that the use and value of the adjoining land should, from all time and under all circumstances, be restricted and diminished by reason of the continuance of acts incapable of physical interruption, and which the law gives no power to prevent. The smith, in the case supposed, might protect himself by taking a sufficient curtilage to insure what he does from being at any time an annoyance to his neighbor; but the neighbor himself would be powerless in the matter. It is admitted that individual cases of hardship might occur in carrying out this principle; but, on the other hand, the negation of the principle would at the same time produce a prejudicial effect upon the development of land for residential purposes. It will be seen therefore that, in the interests of the public as much as in private and individual interests, it is important to consider how and under what circumstances a man may restrain his neighbor from carrying on a trade in such a way as to be a nuisance and injurious to him or his property.

In the case to which we have referred the plaintiff and defendant were neighbors, and held leases under the same landlord. The defendant was a wheelwright, and since the year 1848 had carried on his trade upon the premises adjoining those of the plaintiff. The plaintiff, in the year 1875, entered into occupation of his house, which had previously been used, first, as a furniture maker's workshop, and as to the part immediately adjoining the defendant's premises, as a gas-fitter's and smithy. This portion of his premises the plaintiff converted into an artist's studio, and after the lapse of four years complained of the increased noise caused by the defendant in carrying on his business. The defendant made attempts to lessen the noise and abate the nuisance complained of, but apparently without succeeding in satisfying the plaintiff, who eventually brought his action. It was alleged by the plaintiff that the noise caused by the defendant amounted to an actionable nuisance, and there seems to have been no doubt, on the evidence, that this was so. The Court accordingly granted an injunction restraining the defendant from

carrying on his business in such a manner as to cause a nuisance to the plaintiff, and the Court of Appeal suspended the injunction for a month in order to give the defendant time to make alterations, so as to abate the nuisance or find new premises.

The facts of this case present no very unusual features, but they serve, nevertheless, to illustrate the danger which a man incurs who, engaged in any trade or occupation likely to cause annoyance to his neighbors, invests his capital on the assumption that he will be allowed, on the faith of his business having been for many years established, to continue it without interruption. The noise made by the defendant in his business did not amount to a nuisance until the plaintiff converted the old smithy into an artist's studio, and when this portion of his house came to be used for the purpose for which it was intended, the noise made by the defendant in carrying on his business became a nuisance to the plaintiff. It has often been urged under such circumstances that a man may acquire by user a right to create a noise even amounting to an actionable nuisance; but it is well to bear in mind that user of this kind, in order to support such a contention, must neither be forcible user nor user by stealth, but must be open and of right. Now a man cannot, by anything he can do on his own property, prevent his neighbor from making a noise. If he enter on his neighbor's property for the purpose he becomes a trespasser. In the case referred to the plaintiff could not even have taken action, for the reason that the noise did not become an actionable nuisance until the studio was erected. It did not hurt anybody so long as the plaintiff's premises were not required for artists' purposes. The plaintiff therefore could not have prevented the noise from continuing by action; neither could he have physically prevented it, for a man has no more control over the waves of sound than he has over the wind. No easement or right by user had, therefore, been acquired by the defendant in the present case.

As a further illustration of the principle adopted by the courts in dealing with questions of this kind, it may be well to mention a case decided a few days ago, in which the facts were very similar to the present. A confectioner had for more than twenty years used a pestle and a mortar in his back premises, which abutted on the garden of a physician, and the noise and vibration were not felt as a nuisance, and were not complained of. The physician erected a consulting-room at the end of his garden, and then the noise and vibration became a nuisance to him. He accordingly brought an action for an injunction. The defendant pleaded that he and his father had carried on the business, which, by the way, was in Wimpole Street, for more than sixty years, and that he had acquired a prescriptive right by user to continue to do so. It was held, however, that inasmuch as the noise did not become an actionable nuisance until the plaintiff erected his consulting-room, no such right existed, and that the right to make a noise so as to annoy a neighbor could not be supported by user unless during the period of user the noise had amounted to an actionable nuisance.

This decision is founded, as in the former case, upon the principle that user which is neither physically capable of prevention by the owner of the servient tenement, nor actionable, cannot support an easement. We are still, however, as far as ever from arriving at a clear conception of what an actionable nuisance is. We are told that regard must be had not only to the thing done, but to the surrounding circumstances. What might be a nuisance in one locality might not be so in another. The truth of this latter observation is self-evident; but we are not in any way, while admitting its truth, enlightened as to the nature of the circumstances which will permit a man to cause a nuisance to his neighbor in one locality or the other. One would have thought that an artist who voluntarily selected a house which had been used first, as a furniture-maker's workshop, and, secondly, as a gas-fitter's smithy, could not have much to complain of if his neighbor was a wheelwright who found it necessary to make a noise in carrying on his business. On the other hand, the wheelwright might have a good deal to complain of in the artist who selected the old gas-fitter's shop, where a trade as noisy as his own had probably been carried on before, and dedicated this uncongenial spot to the Muses. Surely such an erratic selection might be regarded as "a circumstance" worthy of consideration in determining whether the wheelwright's business was a nuisance or not.

It may be urged, and doubtless with some degree of truth, that to allow the continuance of a nuisance would be to discourage, if not altogether to prevent the development and improvement of the property in the neighborhood. But wheelwrights are as necessary to the community as artists, and we should hardly suppose, from what appears on the evidence to be the character of the property in question, that the wheelwright's business was at all out of place, or that the artist's studio was likely to be any permanent improvement upon the gas-fitter's smithy. The rapid increase of building operations in our large towns, and the constant changes, often difficult to account for, in the character and value of house property, and the uses to which it is devoted, render considerations such as those to which we have adverted of the utmost importance in determining the merits of cases of this kind, and it would almost seem that such "local circumstances" were not sufficiently taken into account in determining upon the respective claims of the artist and the wheelwright in the case we have quoted. — *The Architect.*

Oyster-Shell Windows.— The windows of houses in the Philippine Isles are made of pellucid oyster shells, which admit light, but cannot be seen through.

THE DONJON OF COUCY.

A LETTER from Coucy-le-Château to the Philadelphia *Telegraph* says:—

Coucy-le-Château stands upon a crest of a hill, with an old village not very far from it, most of the houses in which have been built from the débris of the castle. For in 1652, during the wars of the Fronde, the magnificent château was besieged by the orders of Cardinal Mazarin, and after a stout resistance it fell. Then Mazarin gave orders to have the place dismantled, and a mine was fired beneath the grand tower of the donjon. The explosion blew everything through the top, just as a shot passes through a cannon, but though deep fissures were made in the walls, the tower remained standing. Then for generations the people of Coucy helped themselves freely to all the stones and masonry which they happened to want, until at last the French Government undertook to protect the ruin, and now an old so'dier takes care of it, and the Government is propping up the walls and closing up the fissures. Fortunately, a complete restoration, such as that which M. Viollet-le-Duc carried out at the Château of Pierrefonds, is impossible. The castle will always remain a ruin, but such a ruin as must fill every beholder with wonder and admiration. M. Viollet-le-Duc strongly recommended romancists and historians, instead of drawing upon their imaginations for a vivid description of mediæval life, to go and see this sombre pile. Nothing, he says, can give a better idea of the feudal times than this superb monument which even the earthquake has not been able to cast down. Victor Hugo profited by this advice, and we have the result in *Quatre-vingt-Treize*.

As one stands at the foot of the tower and gazes upwards to the summit, where the battlements remain unbroken, it is impossible to repress a feeling of amazement, not only at the prodigious character of the work, but at the thought that the whole of this part of the castle was built in five years — that is to say between 1225 and 1230. It was the famous warrior, Enguerrand III, who constructed this immense pile at a time when, as it is believed, he aimed at nothing less than to seize the Crown of France. The magazines beneath the walls were capable of holding ample supplies of provision for 1,000 men for a whole year. On a single floor or story of the donjon 1,500 men could easily have been assembled. The tower is 187 feet in height and 335 feet in circumference, and the walls are thirty-four feet in thickness. If the reader will compare these dimensions with those of any other tower known to him in New York or elsewhere — even with those of the famous tower near the City Hall which was once so great a source of amusement to the *Sun* and its subscribers — he will be able, perhaps, to form a faint idea of the imposing appearance which this mass of masonry must present. It was built to last forever, and it seems likely, at least to endure as long as any other of the works of man. But the sires of Coucy have passed from the earth. It was a fighting race, and most of them perished on the field of battle. The son of the builder of Coucy, Raoul, fell at Mansourah, in Egypt, and the last of the Enguerrands died in a foreign land in 1396. In 1400 the castle came into the possession of Louis of Orleans, and in the Orleans family it still remained until the days of Louis Philippe of Orleans, called "Egalité." Now it belongs to the French Government, and ever since 1856 large sums of money have been spent in carrying out necessary repairs. The walls were, as M. Viollet-le-Duc says, "*lezardé*" by the explosions of the mines of Mazarin's engineers, but now these yawning chasms are only marked by the new blocks of masonry which have been inserted. The venerable appearance of the ruins has not in any way suffered.

The tower so impressed me that I have scarcely ventured to refer to the other parts of the castle, although they are considerable in extent. There are four other towers at each corner of the château, inclosing guard-chambers, beneath which are three stories of dungeons accessible only by a large round hole in the middle of the floor: down this hole the prisoners were lowered, and slight indeed must have been their hope of ever coming out alive. Women and men alike were inclosed within these gloomy vaults, the victims of the fierce raids which the sires of Coucy made upon all the surrounding country. Enguerrand the Great carried his ravages as far as Leon, and on one occasion he bore off the dean of the cathedral there and shut him up in one of his fearful dungeons. As the old soldier who now acts as guardian told us, only "distinguished prisoners" were made captives in these dens — the other sort were taken outside the walls and hanged. There never could be the least hope of escape for any one who crossed the drawbridge. The town outside was surrounded by massive walls, which still remain, and between the town and the castle were two enormous moats and another range of walls, and then the donjon, and the guard-chambers beyond. Perhaps the prisoners who were least to be pitied were those who met their fate at once at the hands of the executioner.

You will remember the picture which Victor Hugo draws of the dungeon in which first the old Marquis, and then his deliverer, the young Vicomte, were immured. The very place exists to this day at Coucy.

THE BRICKWORK OF CHIMNEYS.

In a communication to the *Deutsche Bauzeitung*, Herr Eckhartz has expressed his opinion that the cause of crevices being formed in the brickwork of chimneys is the difference of temperature between the inner and outer surfaces. While in many cases in an ordinary factory chimney the mantle has internally a temperature of nearly 600° Fahr., the external temperature is only about 60° on an average, the difference of expansion which is thus occasioned producing the cracks referred to. He dwells upon the use of iron hooping, and remarks that its object and result are not, strictly speaking, the prevention of expansion, but rather the attaining in the outer brickwork of a uniform distribution of the tension, and the prevention of its concentration at certain points.

The question whether wrought-iron rings in the inside of a mantle are liable by their own expansion to produce cracks, has been for some time under discussion in German technical circles. A short time ago, Dr. Tomei recorded in the journal referred to, his opinion that the binding of chimneys by means of iron inside the masonry was a measure only to be recommended in exceptional cases, and with the observance of special care in its execution. He considered that the external binding of brickwork was, however, a question which was to be regarded in a different light. Herr Eckhartz, though not founding his remarks exactly on those of Dr. Tomei, further illustrates them by saying that if iron-work placed internally fails to prevent cracks, and even produces them, its employment in that way is not only superfluous, but injurious. If rightly constructed, he considers that for resisting the effects of the wind, no hooping is required by a chimney. In further elucidation of the theory that internal hooping is unsuitable, he remarks that the iron-work should, as a matter of course, not be exposed to a high temperature; and he maintains that all rings inside masonry must, under these circumstances, be subjected to the influence of heat. If they have not sufficient space for their expansion, they exercise a pressure upon the external brickwork, and thereby produce cracks.

From the facts thus quoted Herr Eckhartz deduces the recommendation that in order to provide against the results of the difference in temperature to which allusion has been made, double walls should be constructed. He refers to the chimneys for circular furnaces which have been designed on this principle by Herr Hoffmann. He uses double mantles, each only half a brick in thickness, which are united by vertical ribs of the same thickness. Inside the chimney is an isolated mantle, half a brick thick, which is built up to the height of 11 to 22 yards, according to temperature ruling in the chimney. This mantle is exposed to the most intense action of the heat, and from the nature of its construction is not injuriously affected by any extension which takes place. Herr Eckhartz claims for this method of construction the subsidiary advantage of economy in fuel, and adds that his personal experience confirms him in the opinion that it is the only system by the use of which iron hooping can be completely dispensed with.— *The Builder.*

MONTHLY CHRONICLE.

March 1. Burning of Lyken's Opera-House, Columbus, Kan.

March 11. The roof of the Payret Theatre at Havana, Cuba, falls at midday, crushing several persons.

Death of Prince Gortschakoff, ex-chancellor of the Russian Empire.

March 12. The court-house of McPherson County at McPherson, Kan., is burned.

March 15. Attempt to blow up the Government Board Office, Westminster, London.

March 16. The failure of a gallery support causes a panic in the Cosmopolitan Theatre, New York.

March 18. Fire and panic in Faranta's Pavilion, New Orleans, La., during the performance. Four persons fatally crushed.

CREMATING EXCRETA.

Wyanet, Illinois, March 28, 1883.

To the Editors of The American Architect: —

Gents, — Being a reader of your monthly *Architect*, I take the liberty of asking a little information on a question of interest to me and perhaps to others. I have a small business lot about thirty-eight feet square on which I wish to build a grocery store with basement, and have convenient dwelling-rooms above on second floor. What bothers me is to know how to have a convenient and practical-working privy from this second floor on inside of building, as the building will cover the whole of the lot: we have no water-works here and very little descent of ground in any direction. Could get 5 feet by going about 80 rods, — I expect to use a drain. My idea was to build a good sized chimney from basement in connection with privy and arrange so as to dispose of soil by cremation and run the urine into drain. Do you know of this ever being done in this way and can it be made practical? If you think not, what is the most practical plan in use to obtain the results I wish?

If you should answer through the *Architect*, please publish in the monthly issue, and oblige, Yours truly,

W. Yearnshaw.

[Something depends upon the amount of money our correspondent wishes to spend. With a tank and force-pump, soil-pipe, drain, and cesspool at a sufficient distance from the building, a good water-closet would be the most satisfactory apparatus. If this is impracticable, the common French method of building a tight vault in the cellar, or preferably outside of it, with a shaft extending vertically downward from the second story, might be carried out with comparatively little offense, by making the vault or shaft nearly or quite air-tight, and carrying up from the former a ventilating pipe, six or eight inches in diameter, well above the roof. Then there will always be a flow of air downward through the seat, which will keep the air of the closet in motion. If dry earth could be scattered over the contents of the vault each day, and the whole frequently cleaned out and disinfected with powdered copperas, the result would be still better. A still cheaper, but more troublesome appliance would be a portable earth-closet, such as any manufacturer would furnish. The cremation idea we can hardly approve.— Eds. American Architect.]

RECENT TESTS OF BRICK.

Washington, D. C.

To the Editors of the American Architect: —

Dear Sirs,—The following report of tests of bricks made at my request upon the Government testing-machine may be of sufficient interest to builders to merit publication in your valuable journal.

M. C. MEIGS, U. S. A.
Retired.

Watertown: Mass., December 16, 1882.

COMPRESSION OF BRICKS, TESTED FOR NEW PENSION BUILDING, (SUPERVISING ENGINEER AND ARCHITECT,) WASHINGTON, D. C.

Bricks tested between flat iron compression platforms, compression faces of bricks ground flat.

No. of Test.	Marks on Brick.		Sectional Area.	Ultimate Strength. Total lbs.	lbs. per □″	Bearings.	Remarks.
2531	W. H. West & Bro.	Red	4.00″ x 8.50″ = 34.00□″	324,500	9,540	even.	Cracking sounds heard at 183,000 lbs.
2532	" "	Arch	3.95 x 8.50 = 33.58	255,200	7,600	uneven, required .01″ packing	" " " 30,000 " Fractures in sight at 80,000 lbs.
2533	" "	Pressed	4.20 x 8.50 = 35.70	231,000	6,470	even	Cracking sounds heard at 125,000 lbs. Cracks in sight at 150,000 lbs.
2534	Washington Brick Co.,	Red	4.10 x 8.47 = 34.73	296,200	8,530	"	Cracks in sight at 32,000 lbs. at corner. At 130,000 lbs. specimen covered: no more cracks in sight.
2535	" "	Arch	3.80 x 8.30 = 31.54	324,500	10,290	"	Cracking sounds heard at 65,000 lbs. Specimen covered when load reached 150,000 lbs.; no cracks in sight.
2536	" "	Pressed	4.10 x 8.35 = 34.24	314,700	9,190	"	Cracking sounds heard at 68.000 lbs. Began to crack along edge at 110,000 lbs.
2537	Childs & Son,	Red	4.15 x 8.40 = 34.86	211,000	6,050	"	Began to flake along one corner at 78,000 lbs.
2538	" "	"	4.10 x 8.46 = 34.69	209,300	6,030	"	" " " off at edges at 107,000 lbs.
2539	" "	"	4.10 x 8.45 = 34.65	232,000	6,700	.005″ packing under one corner	" " " corner at 140,000 "
2540	" "	Arch	3.70 x 8.10 = 29.97	203,700	6,800	even	Cracks appeared generally at 85,000 "
2541	" "	Pressed	4.20 x 8.40 = 35.28	210,200	5,960	"	Began to flake off at one edge at 110,000 lbs.
2542	B "s, Russell & Co.,	Pressed	4.30 x 8.58 = 36.89	249,000	6,750	"	Cracking sounds at 128,000 lbs. Cracks in sight at 140,000 lbs.

(Signed) JOHN G. BUTLER,
Captain of Ordnance, Commanding.

GRANULATED-SLAG MORTAR.

Alleghany City, March 22, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Will you please inform me in the next issue of your paper as to the merits of mortar made from granulated furnace slag, as practised at the Tees Iron Works, Middlesboro, Eng., and at what other places, if any, you know of its having been used.

Yours truly, Jos. A. Shinn.

[We do not know about mortar made with furnace slag, but presume it must be used in place of ordinary sand. Brick of pressed slag-concrete are extensively used all through the Cleveland District and even in London. — Eds. American Architect.]

AN ARCHITECTURAL MUSEUM FOR NEW YORK.

New York, March 31, 1883.

To the Editors of the American Architect: —

Dear Sirs, — *Il va sans dire* that in bodies constituted of so many varying elements as the A. I. A., there is likely to be in the current work of its volunteer officers less romance than often thankless drudgery. But I will now give you and your readers a little episode somewhat flavored with that unusual former ingredient in my Institute experience.

Between two and three years ago one of the active members of the Institute and of the New York Chapter, Mr. Napoleon LeBrun, on promise of strict secrecy, told me he had exerted a certain influence which he had just received assurance would sooner or later inure to the great benefit of that Chapter and the interests which it is its aim to guard and foster. Last Friday a friend of his, Mr. Levi Hale Willard (a collateral descendent of the martyr spy, who met his death in this city during the Revolution), died of consumption, and yesterday morning, as Mr. LeBrun, a day or two after his friend's death, intimated to me would be the case, a notice like that which I enclose appeared in most of the papers. Yesterday, on seeing Mr. LeBrun he handed me the original of the enclosed copy of a posthumous letter to himself from Mr. Willard, received an hour or two before.

I commend this letter from the dead alike to those who have the means to foster what Mr. Willard thought the "grandest of all the arts," and to those who might, like Mr. LeBrun, use an unselfish influence to attract those means. The Institute would, indeed, prosper if each of its centres could be ensured such benefits as those the New York Chapter will dispense through him.

Yours truly, A. J. Bloor.

New York, November 25, 1881.

My Dear Mr. Le Brun: —

Your reception of this will be the announcement that I have passed from this world.

You are aware that I have long since made a bequest to the Metropolitan Museum of Art of money to be devoted to the founding of a museum of architecture, to be placed on exhibition in its galleries. It is a subject that has often been discussed between us for years past.

My object in writing this is to put on record my desire, lately expressed to you, that to your son, Pierre, be assigned the duty of making the collection, under the direction of the Commission designated in my will. He thoroughly understands my views and is in harmony with them, and I am satisfied would carry them out to my entire satisfaction. If my wishes can have any weight in the matter I trust they will receive due consideration.

If it shall prove that I have done something to cultivate and encourage a popular taste for this grandest of all the arts, I shall be recompensed for what I have done, although I may never know of it.

With kind wishes for you and yours, I am,

Very sincerely your friend, Levi H. Willard.

[The will of the late Levi Hale Willard, who was a large stockholder in the American Express Company, was admitted to probate in the Surrogate's office yesterday. After mentioning some minor bequests, the testator leaves to the trustees of the Metropolitan Museum of Art the remainder of his estate, to be applied to the purchase of a collection of models, casts, photographs, engravings, and other objects illustrative of the art and science of architecture, to be kept on permanent exhibition in the museum. The collection is to be made under the direction of a commission chosen by the New York Chapter of the American Institute of Architects, one member of which shall be the architect, Napoleon LeBrun. The bequest is conditioned on the funds being applied solely for the purpose designated, and no part thereof to the acquisition of antiquities or other objects not strictly relating to architecture, constructional or decorative. The expenses attending the making and arranging of this collection, as well as the annuity directed to be paid the testator's mother, may be defrayed from the revenues of the property bequeathed as received, the balance to be added to the principal so long as any portion thereof remains unexpended. In case the trustees decline to accept this bequest on the conditions prescribed, it will go under like conditions to the Trustees of Columbia College. Alexander Holland, of this city, and Robert A. McKinney, of Brooklyn, are appointed executors. The will is dated July 25, 1881, and on November 25, 1881, a codicil was added to the effect that owing to the increase in the value of the estate since the making of the will, the bequest to the Trustees of the Metropolitan Museum of Art might amount to a larger sum than would be required to fully carry out its provisions. The testator, therefore, directs that only so much of the bequest be applied to the acquisition of the architectural collection as may be required in the judgment of the commission, its members to be the sole judges of its extent and the amount to be expended thereon. The remainder of the bequest, if any, is to be employed in the purchase of landscape and *genre* pictures of the modern French school, to be added to the galleries of the museum.— *New York Times*, March 30, 1883.

AN OPENING IN THE NORTH-WEST.

St. Paul, Minn., March 31, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Will you please to make public in your "Building Intelligence" that there is a great scarcity here of good architectural draughtsmen. A dozen good draughtsmen could find plenty of employment here and in Minneapolis. Is your bureau for placing draughtsmen still in operation? Please do something in this matter.

Yours respectfully,

George Wirth.

NOTES AND CLIPPINGS.

Yankee Enterprise in Europe.— Some very singular advertisements appear from time to time in the newspapers. One of the most curious has lately been observed in a Paris paper, where a certain "Yankee Engineer" thus addresses all "whom it may concern": "Having visited the Leaning Tower of Pisa, Italy, I am fully convinced that the architectural grandeur and beauty of this ancient and colossal relic of past ages can be wonderfully improved. I hereby offer to contract to put this immense structure in a perpendicular position and raise it to a level of the ground for the sum of $600,000, the terms of payment and time of completion to be agreed upon, the time not to exceed ninety days." There is something truly American in the matter-of-fact way in which this audacious proposition is advanced. If now, as might readily happen if the idea occurred to him, some Yankee patent-medicine manufacturer should come forward and offer to defray the expenses of this gigantic work on condition that he be permitted to paint the advertisements of his particular panacea all over the outside and interior of this tower, the glory of the great American eagle would be sensibly enhanced. In fact if the Europeans were only in any degree "up to snuff" they might have all their scandalously-neglected ruins put into complete repair on similar easy terms. — *Exchange.*

Trees in Streets. — The *Building and Engineering Times* says, in reference to a controversy which has been going on in Geneva on the utility or otherwise of trees in public squares and streets: We should have thought that there could be little difference of opinion on the subject. The foliage is grateful to the pedestrian in hot weather, and it shelters him in wet weather, while the entire appearance of the street is improved by a row of green trees. An ingenious opponent of this pretty general opinion asserts that so far from the trees being healthy they are quite the reverse, inasmuch as they impede the circulation of air; and as for those individuals who prefer shade to sunshine, they have only to walk on the shady side of the street to attain their desire. Certainly, if the trees are planted without judgment, they will impede the circulation of the air; if planted in too close contiguity to each other, the effect cannot be beneficial to the general health. Nor should they be allowed to come in contact with the buildings near which they grow. There is not much chance of any of these contingencies occurring in the metropolis; rather are the trees too few and far between. A most important function is also performed by the roots of the trees in drawing up stagnant waters and absorbing organic matters in the subsoil. These are advantages not to be ignored by householders in large towns, where the drainage is very often defective.— *Pall Mall Gazette.*

Funereal Furniture. — The following story would be almost incredible if the facts had not been stated in evidence a fortnight ago before a French court: Some months ago M. Aurille, an architect, ordered of a Paris upholsterer, named Distruit, a suit of bed-room furniture for 2,500 francs. He was delighted with his bargain, until one morning his wife, while dressing, read on the back of the toilet-table "*Regrets eternels*" engraved in the marble. The effect produced upon her mind by this discovery led to further investigation of the furniture. The marble top of a chest of drawers was lifted, and on the under side M. and Mme. Aurille read: "*Bon père, bon epoux.*" All speculation was then at an end. M. Distruit had gone to a cemetery for his marble slabs. M. Aurille declared that he would have no such sepulchral memorials in his house, and asked the tradesman to take back the furniture. The latter having declined the architect refused to pay the bill. The Court held that the marble was not less marble because it had once been put to funereal uses, and ordered M. Aurille to pay the account. — *Exchange.*

Black-Listing.— Here is a practical suggestion. When a man is caught selling bad milk, the proper authorities advertise his name. Now, if a building takes fire through carelessness in the construction, let the officers of the law advertise the name of the responsible party. No injustice would be done by that. — *Boston Herald.*

The Building Inspectors of Baltimore have given orders that the doors of 59 churches in that city be made to swing outward. Nearly every church building in the city was found to have its outer doors swinging inward.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

274,465-466. SEWER-INLET. — Edward Z. Collings, Camden, N. J., and Charles F. Pike, Philadelphia, Pa.

274,481. STAPLE. — Stiles Frost, Boston, Mass.

274,484. WAX COMPOUND. — Peter C. Ghaler, York, Pa.

274,499. BOLT-CUTTER. — Jophanus H. Kennedy, New Vineyard, Me.

274,514. TILE-MACHINE. — George Potts, Indianapolis, Ind.

274,528. ELLIPSOGRAPH. — Charles W. Stickney, Washington, D. C.

274,536. WEATHER-STRIP. — Joseph Walker, Belleville, Kan.

274,544-545. WRENCH. — Frank Armstrong, Bridgeport, Conn.

274,563. STONE-TURNING LATHE. — Thomas F. Clemons, Tiverton, County of Devon, England.

274,564. LIGHTNING-CONDUCTOR. — James H. Coon, Des Moines, Io.

274,565. PLANING-MACHINE. — Allen P. Creque, New York, N. Y.

274,599. WATER-PROOF PAINT. — Elam Hays, Clear Lake, Iowa.

274,600. RABBET-PLANE. — Oliver Hegglund, Oakland, Neb.

274,605. DRAWING-TABLE. — Arnold Hormann, Hoboken, N. J.

274,628. WATER-CLOSET VALVE. — John McGuire, Milwaukee, Wis.

274,631. PIPE-CUTTER. — John Miller, Cambridgeport, Mass.

274,644. WATER-CLOSET. — Andrew G. Myers, New York, N. Y.

274,657. FIRE-ESCAPE. — Robert L. Pruyn, Baton Rouge, La.

274,658. LOCK FOR SLIDING-DOORS. — Charles S. Rees and Patrick Milis, Pueblo, Col.

274,676. HEATING-FURNACE. — Felix Tylee, Cleveland, O.

274,711. BORING-BIT. — William W. Brigg, Washington, D. C.

274,725. REVOLVING WATER-CLOSET STENCH-TRAP. — Lee D. Craig, San Francisco Cal.

274,734-735. MANUFACTURE OF PORTLAND CEMENT. — Edward J. De Smedt, Washington, D. C.

274,765. AUTOMATICALLY-OPERATING DOOR. — John L. Hawkey, Cape May, N. J.

274,770. AUTOMATIC CLUTCH FOR ELEVATORS. — Edwin T. Herrick, Providence, R. I.

274,775. FILE. — William Huger, Newark, N. J.

274,777. SELF-CLOSING HATCHWAY. — David Humphreys, Norfolk, Va.

274,785. HEATER. — Jonathan Johnson, Lowell, Mass.

274,789. PRODUCTION OF DISINFECTANTS. — Chas. T. Kingzett, 17 Lansdowne Road, Tottenham, and Maximilian Zingler, 19 Buckland Crescent, Belsize Park, County of Middlesex, England.

274,826. STEAM-RADIATOR. — David Renshaw, Braintree, Mass.

274,831. SASH-CORD GUIDE. — James Shannon, Washington, D. C.

274,838. CLAMP. — Charley Steineke, Brooklyn, N. Y.

274,844. SELF-CLOSING HATCHWAY. — Richard D. Thackston, St. Louis, Mo.

274,846. FIREPLACE. — Melchesedeck Y. Thompson, Arkadelphia, Ark.

274,868. DEVICE FOR FILLING PIPE-JOINTS. — Thomas Watkins, Johnstown, Pa.

274,876. INSERTIBLE SAW-TOOTH. — William Zerman, Trenton, N. J.

274,886. PLANING-MACHINE. — Jacob M. Cook and Jesse S. Perkins, Lake Village, N. H.

274,887. AUTOMATIC GATE FOR ELEVATORS. — Geo. V. Delue, Boston, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report thirty-six permits have been granted, the more important of which are the following: —

Fanny Carretter, three-st'y brick building, s s Chase St., w of Valley St.

Baltimore & Ohio R. R. Co., an elevator, 70′ x 158′, s w cor. Henrietta and Howard Sts.

Wm. S. Taylor, Jr., 2 three-st'y brick buildings, s w cor. Fayette St. and Vincent Alley, and two-st'y brick building in rear.

Geo. R. Presstman, 11 two-st'y brick buildings, s w cor. Chesapeake and Lancaster Sts.

C. G. Summers, three-st'y brick building, e s Little Sharp St., n of Baltimore St.

Henry Smith, 4 two-st'y brick buildings, e s Castle St., n of Fairmount Ave.; also 2 three-st'y brick buildings, w s Chester St., n of Fairmount Ave.; also, 8 three-st'y brick buildings, s s Montrose St., e of Gilmor St.

Solomon Frank, three-st'y and mansard brick building, e s Eutaw Pl., n of Townsend St.

John Waters, 8 two-st'y brick buildings, w s Parrish Alley, s of Mulberry St.

John F. Ehlen, three-st'y brick building, w s Jasper St., between Franklin and George Sts.

Jos. M. Cone, 6 three-st'y brick buildings, w s Calhoun St., s of Lafayette Ave.

B. F. Smith, 7 two-st'y brick buildings, e s Haubert St., n of Fort Ave.

Geo. A. Blake, 2 three-st'y brick buildings, e s Eutaw Pl., between Townsend and Mosher Sts.

Union Passenger Railway Co., two-st'y brick addition to stable, s e cor. Frederick Ave. and Smallwood St.

B. Frank Leitch, greenhouse to No. 320, w s Caroline St., between Preston and Biddle Sts.

S. Devereux, 2 three-st'y brick buildings, e s Harford Ave., between Madison and Chew Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Marlborough St., No.* 257, Ward 11, for William Simes, dwell., 24′ x 62′, four-st'y pitch; Woodbury & Leighton, builders.

Newbury St., No. 113, Ward 11, for George R. Shaw, dwell., 28′ x 65′, four-st'y flat; Norcross Bros., builders.

Wood. — *George St.*, near Hudson St., Ward 20, for Chas. E. Titus, dwell., 24′ x 35′, two-st'y pitch; F. W. Webster, builder.

West First St., No. 378, Ward 14, for Geo. W. Bail, storage, 47′ x 50′, one-st'y flat; Geo. W. Bail, builder.

Webster Ave., near Brighton Ave., Ward 25, for Jacob W. Berry, carpenter-shop, 22′ x 34′, two-st'y pitch; Jacob W. Berry, builder.

Tremont St., opposite Wigglesworth St., Ward 22, for Michael J. Shay, dwell., 25′ x 35′, two-st'y hip; McDonald & Tobin, builders.

East Fifth St., Nos. 520-524, Ward 14, for Lyman Locke, 3 dwells., 15′ x 34′ and 12′ x 13′, one-st'y mansard; Lyman Locke, builder.

Baldwin Pl., Ward 25, for B. F. Fiske and C. Marshall, 2 dwells., 20′ x 40′, two-st'y flat; Benj. Wood, builder.

Faxon St., No. 12, Ward 22, for James Devine, dwell., 20′ x 34′, three-st'y flat; Thomas Donahue, builder.

Private way from Washington St., near Madison St., Ward 25, dwell., 26′ x 27′, two-st'y pitch; Samuel N. Davenport, builder.

River-View St., rear, near Huntoon St., Ward 24, for Geo. H. Cavanagh, storehouse, 30′ x 36′, one-st'y pitch.

Houghton St., near Houghton Court, Ward 24, for B. F. M. Stoddard, dwell., 15′ x 32′, two-st'y pitch; H. P. Oakman, builder.

Train St., rear of, cor. Boutwell St., Ward 24, for M. M. Saunders, stable, 30′ x 40′, two-st'y mansard; Wm. A. Blazo, builder.

Crescent Ave. extension, near Cambridge St., Ward 14, for Otis S. M. Haskell, stable, 20′ x 22′, and 20′ x 20′, two-st'y flat; Spence, builder.

Smith St., No. 105, Ward 22, for James Daley, dwell., 23′ x 35′, three-st'y hip; Samuel Rantin, builder.

Maverick St., No. 382, Ward 2, for John J. Corrigan, boat-house, 30′ x 52′; John J. Corrigan, builder.

Spring St., cor. Baker St., Ward 23, for Vine Rock Association, lodge-room, hall, and stores, 30′ x 60′, two-st'y pitch; W. S. Mitchell, builder.

East Broadway, No. 670, Ward 14, for Lucy M. Leighton, dwell. and store, 17′ x 50′, one-st'y flat; Lyman Locke, builder.

Brooklyn.

BUILDING PERMITS. — *North Elliott Pl.*, 430′ n Auburn Pl., two-st'y brick school-house, tin roof; cost, $20,000; owner, Board of Education; architect, J. W. Naughton; builders, J. D. Anderson and F. G. Turner.

Fourth Pl., n s, 150′ e Henry St., 3 two-st'y brownstone front dwells., tin roofs; cost, each, $4,000; owner, Alfred Williams, 39 Fourth Pl.; builders, —— Rountree and L. Bossert.

Madison St., Nos. 251 *to* 257, n s, 350′ e Nostrand Ave., 4 two-st'y brownstone front dwells., tin roofs; cost, each, $3,500; owner, architect and builder, T. W. Swimm, 389 Putnam Ave.; mason, P. Costello.

Quincy St., n s, 200′ w Tompkins Ave., 4 two-st'y brick dwells., tin roofs; cost, each, $4,500; owner, Paul C. Grening, 420 Gates Ave.

Beaver St., n w cor. Park St., three-st'y frame tenement, tin roof; cost, $4,000; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, T. Englehardt.

Flushing Ave., No. 694, s s, 125′ w Throop Ave., three-st'y frame double tenements, tin roofs; cost, $4,500; owner, Peter Stebe, 13 Whipple St.; architect, T. Englehardt; masons, W. Rauth and J. Rueger.

South Fourth St., n s, 95′ w Tenth St., 2 four-st'y brick tenements, tin roofs; cost, each, $10,000; owner, Alexander Wake, 427 Pleasant Ave., N. Y.; builder, Jas. Gault.

Ten Eyck St., n s, about 200′ e Ewen St., three-st'y frame double tenement, tin roof; cost, $4,500; owner, Anton Schuster, on premises; architect, E. F. Gaylor; builders, J. McQuaid and Jenkins & Gillies.

Diamond St., w s, about 150′ s Norman Ave., 2 three-st'y frame double tenements, gravel roofs; cost, each, $3,500; owner, Owen Galagher, Newel St.; architect, F. Weber; builders, McHugh Bros. and Randall & Miller.

Broome St., No. 46, s s, 50′ w Humboldt St., three-st'y frame dwell., tin roof; cost, $5,500; owner, Hermann Heil, New York City; architect, F. Weber; builders, I. Reed and A. Lange.

Degraw St., No. 340, s s, 207′ w Smith St., three-st'y brick dwell., tin roof; cost, $3,500; owner, architect and builder, N. M. Whipple, 346 Degraw St.

Eighth St., s s, 247′ 10″ w Seventh Ave., 4 two-st'y brick dwells., tin roofs; cost, each, $4,500; owners, E. M. Baker and S. H. Bortsly, Tenth St., near Sixth Ave.; architect and builder, T. Corrigan; mason, W. Corrigan.

Grand St., n s, 25′ e Seventh Ave., three-st'y brick store and dwell., tin roof; cost, $6,500; owner and builder, Jas. Winham, 28 Bedford Ave., architect, E. F. Gaylor; mason, J. Bisson.

St. Marks Ave., n e cor. Carlton Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $9,000; owner and builder, John Monas, 92 Park Pl.; architect and carpenter, J. J. Gilligan.

Fifth St., n s, 299 w Seventh Ave., 12 two-st'y brick dwells., tin roofs, frame and tin cornice; cost, each, $3,500; owner and mason, Charles Long, 383 Eleventh St.; carpenter, J. F. Wood.

Fifth St., n s, 24′ w Seventh Ave., 6 three-st'y brownstone front dwells., tin roofs, frame and tin cornice; cost, each, $4,500; owner and mason, Chas. Long, 383 Eleventh St.; carpenter, J. F. Wood.

Luqueer St., n s, 165′ w Court St., 2 three-st'y brick tenements, tin roof; cost, $3,500; owner, architect and builder, Thos. Keogh, 151 Nelson St.

ALTERATIONS. — *Sand St.*, n w cor. Adams St., raised one-st'y, tin roof, iron girders furnished for basement wall; cost, $6,000; owner, Hugh Larkin, cor. Jay and Prospect Sts.; architect, J. F. Thomas; builders, P. J. Carlin and Long & Barnes.

Franklin Ave., No. 482, two-st'y brick extension, tin roof; cost, $4,500; owner, D. M. Stone, on premises; architect, A. Hill; builder, B. Linikin.

Chicago.

FACTORY. — Plans were prepared by Treat & Folz for the large factory now building by the Western Electric Manufacturing Co., at the corner of Clinton and Van Buren Sts.; it will be five stories, 150′ x 250′, and cost $115,000.

STRIKE. — Between four thousand and five thousand bricklayers in Chicago went on a strike, April 2, for $4 per day. The work on all the principal buildings is stopped.

BUILDING PERMITS. — John Cramer, two-st'y brick store and dwell., 22′ x 55′, 715 Indiana St.; cost, $3,500.

Chas. Dagling, three-st'y brick flats, 27′ x 72′, 383 La Salle Ave., to cost $14,000.

O. M. Sheldon, 2 two-story brick dwells., 43′ x 44′, 48 and 50 Douglass Ave., cost, $8,000.

J. A. Roabe, two-story brick flats, 25′ x 76′, 3814 State St., cost, $5,500.

L. W. Pitcher, two-st'y brick dwell., 26′ x 68′, 2725 Prairie Ave., cost, $9,000.

Fred Meurer, two-st'y brick dwell., 403 Hurlbut St., cost, $5,500.

M. Helzel, two-st'y brick flats, 21′ x 58′, 356, W. Thirteenth St., cost, $4,000.

J. Byson, three-st'y brick dwell., 21′ x 50′, 131 Nineteenth St., cost, $4,000.

C. W. Turner, three-st'y brick dwell., 22′ x 50′, 102 Centre Ave., cost, $5,500.

Wm. Dickenson, 4 three-st'y and basement brick dwells., 64′ x 100′, 600 to 608 Division St.; cost, $60,000.

Phillips & Johnson, 2 three-st'y and basement brick dwells., 48′ x 54′, 250 to 252 Wells St.; cost, $9,000.

E. Fontaine, three-st'y and basement brick dwell., 17′ x 66′, 42 Bellevue Place; cost, $3,000.

Rudolph Bielfeld, three-st'y brick flats, 21′ x 60′, 827 Twelfth St.; cost, $5,000.

Ch. Farr, 5 brick cottages, 36′ x 100′; Thirty-first St.; cost, $5,000.

R. Dannfreo, two-st'y and basement brick flats, 18′ x 48′; cost, $3,000.

New York.

BANK BUILDING. — Messrs. Robert H. Robertson and Jos. B. Lord are to submit competitive plans for the bank-building 40 and 42 Wall St., in addition to the architects previously named.

HALL. — Messrs. Hyde & Behman have purchased the property on the n w cor. of Broadway and Thirty-fifth St., and propose to erect a minstrel hall and flats, to be ready September 1.

THEATRE. — Joseph Hart is negotiating for the purchase of the site of the Park Theatre, at Broadway and Twenty-second St. If successful, Mr. Hart will build a theatre to hold 2,500 persons, and furnish it with a double stage, at a cost of $350,000.

BUILDING PERMITS. — *Eightieth St.*, s s, 124′ e Madison Ave., 7 four-st'y brownstone front dwells., tin roofs; cost, each, $26,000; owner, Terence Farley, 165 East Sixty-first St.; architects, Thom & Wilson.

Seventy-ninth St., s s, 350′ w Ninth Ave., 5 three and four st'y brownstone front dwells., tin roofs; cost, each, $10,000; owner, Samuel Colcord, 400 West Seventy-ninth St.; architect, W. L. Harris.

Ninety-fifth St., n s, 80′ w Third Ave., five-st'y brownstone front tenement and store, tin roof; cost, $14,000; owner and builder, John D. Karst, Jr., 2006 Second Ave.; architect, Wm. Graul.

West Thirty-eighth St., Nos. 550 *and* 552, five-st'y brick factory, gravel roof; cost, $16,000; owner, Mary Cable, 417 West Thirtieth St.; architect, Robert Cable; builders, O. Perrine and John L. Hamilton.

ALTERATIONS. — *East Thirty-second St., No.* 7, a handsome brownstone residence is to be altered and additions made, at an expense of $15,000, for a co-operative apartment-house company. The present building is 25′ x 60′, four-st'y and basement; Messrs. D. & J. Jardine will be the architects.

Philadelphia.

STRIKE. — The house-painters, having demanded an advance from $2.50 to $3.00 per day and been refused, are now on a strike, with a fair prospect of securing the demanded advance.

BUILDING PERMITS. — *Chelten Ave.*, n s, w of Main St., 2 three-st'y stores and dwells., 18′ x 50′; Tourison Bros., contractors.

Chelten Ave., s s, e of Hancock St., three-st'y dwell. and two-st'y stable, 20′ x 60′ and 20′ x 30′; Tourison Bros., contractors.

Snyder Ave., n s, w of Sixth St., two-st'y dwell., 16′ x 42′; Crosby Sellick, owner.

Park Ave., w s, n of Oxford St., 7 three-st'y dwells., 15′ x 58′; J. L. Carre, owner.

Ripka St., n e cor. Mansion St., 3 three st'y dwells., 18′ x 30′; Jno. Bannon, owner.

Broad St., e s, n of Ellsworth St., two-st'y store and dwell., 21′ x 37′; Jno. McConaghy, contractor.

Sixth St., n w cor. Norris St., 7 three st'y dwells., 15′ x 42′; A. M. Zane, owner.

North Second St., No. 554, four st'y addition to store, 16′ x 32′; Thos. McCarty, contractor.

McCalpin St., e s, s of Walnut St., two-st'y dwell., 16′ x 44′; L. W. Goodman, contractor.

Thirty-first St., cor. Jefferson St., n w s, fifth-st'y addition to brewery, 46′ x 58′; F. A. Poth, owner.

Market St., No. 4231, two-st'y dwell., 18′ x 43′; Wm. Bunch, Jr., contractor.

Master St., n s, between Twenty-fourth and Twenty-fifth Sts., 20 two-st'y dwells., 17′ x 39′; J. M. Sharp, owner.

Bids and Contracts.

TOLEDO, O.—Bids have been received for cut-stone for the Toledo Custom-House. Albert Newkom was the lowest bidder, at $58,900 for buff Amherst sandstone.

MEMPHIS, TENN.—Bids were also opened for slating the Custom-House. The lowest bid was that of Knisely & Miller, of Chicago.

ST. LOUIS, MO.—Davidson & Son, of Milwaukee, have been awarded the contract for the marble-work for the Government building, at $8,290.

WASHINGTON, D. C.—The following bids for furnishing about seventy tons of rolled wrought-iron bars, 41, 16 and 1 foot long, for ties and anchors for walls of New Pension Office, have been received.

No.	Bidders.	Residence.	Place of Delivery.	Price per pound. 41 ft. Cents.	16 ft. Bars. Cents.	1 ft. Anchors. Cents.	Tensile strength.	Remarks.
1	J. F. Bailey.	Philadelphia.	Washington.	2.3	2.3	2.3	45,000 lbs. per sq.in.	
				2.5	2.5	2.5	48,000 "	
2	Albany & Rens. Steel & Iron Co.	Troy, N. Y.	N. Y. City.	2.9	2.9	2.9	49,280 "	
3	Jas. Rowland & Co.	Phila.	Washington.	2.8	2.7	2.7	" "	
4	Allentown Rolling Mills.	"	"	2.5	2.5	2.5	" "	
5	Tredegar Iron Works.	Richmond, Va.	"	2.75	2.75	2.75	" "	
6	Phœnix Iron Co.	Phila.	"	2.7	2.7	2.7	" "	
7	Morris Wheeler & Co.	"	"	2.75	2.75	2.75	" "	
8	Pencoyd Iron Works.	"	"	2.73	2.73	2.73	" "	
9	N. J. Steel & Iron Co.	Trenton, N. J.	"	2⅞	2⅞	2⅞	" "	
10	Jas. McGill.	Washington.	"	2.37	2.37	2.37	" "	
11	C. A. Schneider's Sons.	"	"	2.45	2.45	2.45	" "	
12	J. B. Kendall.	"	"	2.39	2.39	2.39	" "	

General Notes.

ALBANY, N. Y.—A brownstone church is to be built for the First Presbyterian Church at a cost of about $80,000. It is to be in the Lombard style of architecture from designs of Messrs. J. C. Cady & Co., of N. Y.

BURLINGTON, VT.—Hon. Frederick Billings of Woodstock has given the University of Vermont $75,000 for the erection of a library building.

DAYTON, O.—The Dayton Electric Light Company will erect a building, 50′ x 100′, at once.

Benjamin Kuhns will build a block of brick and stone stores, at the corner of Fourth and Main Sts.

W. P. Callahan will build a four-st'y brick block on North Main St.

DERRY, N. H.—A Baptist Church is to be built at Derry Depot.

ROCHESTER, N.Y.—The architects are busily engaged in finishing the plans and designs for a new building to be erected by the firm of Alling & Corry on Exchange St., next to the canal.

COMPETITION.

AMERICAN ARCHITECT COMPETITION.

MECHANICS' HOUSES.

I. Our last competition provided for the wants of a man whose income was about five dollars per diem; in the present one we would like to have the competitors turn their attention to a house for a mechanic living on a daily wage of three dollars, who can afford to build only by joining a "building association," or by mortgaging his proposed house, and who, even under such circumstances, ought not to attempt to build a house costing more than $1,500. As it may be fair to suppose that this mechanic and his family are more hardy than more fortunate individuals who enjoy a larger income, he might elect to build, for perpetual occupancy, such a house as the more wealthy would build only for summer use.

The chief essentials in designing such a house are space, good construction, and a careful regard of the limit of expense. The conditions of the present competition are simply that the proposed house shall contain at least six rooms, and shall approximate in cost $1,500. Open fireplaces, bath-rooms, water-closets, furnaces, etc., are to be held as luxuries and not essentials.

Required. A pen-and-ink drawing containing a perspective view of the exterior, plans of both floors and an elevation of one of the sides not shown in the perspective; also as many details as possible. The drawing may measure 14″ x 22″ or 21″ x 33″, to suit the convenience of the designer.

Also, a short reading description, [not a specification] explaining what steps have been taken to keep the cost within the prescribed limit, and a detailed bill of quantities and prices carefully arranged and classified [a great improvement in this respect can be made over many of the schedules furnished in the former competition]. Each competitor is required to obtain an estimate on his design from a trustworthy builder, and furnish the name and address of such builder for publication with the estimate.

For each of the three designs of highest merit a prize of $50 will be paid. No design will be published in the "*American Architect*" previous to the award of the jury, in order that each competitor may have the benefit of the publication of his name and address with his design if he so desires.

Drawings are to be received at the office of the *American Architect*, 211 Tremont Street, Boston, on or before Saturday, April 21.

II. It is possible that two mechanics would perceive the possibility of securing a more commodious habitation by clubbing their purses, and building a double tenement under a common roof. In such a case each tenement might be treated as a distinct dwelling, or it would be fair to suppose that the two mechanics were brothers or intimate friends whose families could live in harmony, and could make use of certain rooms and conveniences in common, as for instance the kitchen, the dining-room, or a larger parlor in addition to the usual living-rooms of each house. Any competitor who attempts to work out this phase of the problem must take care to keep the privacy of the two dwellings in all other respects well marked. Building thus under one roof, and on a common foundation, each mechanic might expect to obtain a larger dwelling, having at least seven rooms, without materially increasing their combined expenditure, which the competitors must try and keep within $3,000.

Required. A pen-and-ink drawing 22″ x 30″ containing a perspective view; plans of both floors, and an elevation of one side not shown in the view; framing plans at a small scale and all necessary details.

Also, a short skeleton specification, a detailed bill of quantities and prices, and a tender from some reputable builder, name and address being furnished for publication.

For the best designs in the order of their excellence will be awarded prizes of $100, $75 and $50 respectively.

Drawings must be received at the office of the *American Architect* on or before Saturday, May 19, next.

PROPOSALS.

PROPOSALS FOR BUILDING A STEAM VESSEL FOR THE U. S. COAST AND GEODETIC SURVEY.

U. S. COAST AND GEODETIC SURVEY OFFICE,
WASHINGTON, D. C., March 15, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 M., on June 1st., 1883,** and opened immediately thereafter, for building a wooden steam vessel for this service.

The approximate dimensions are one hundred and seventy-four feet length, twenty-seven feet nine inches breadth (extreme), eleven feet five inches depth; displacement, seven hundred and eighteen tons.

Blank forms on which proposals must be made, specifications and any necessary information can be obtained on application to the Hydrographic Inspector of the Survey at this office.

380 J. E. HILGARD, Supt.

STEAM-HEATING APPARATUS.

[At Topeka, Kansas.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., April 2, 1883.

Sealed proposals will be received at this office **until 12 M., on the 24th day of April, 1883,** for supplying and fixing in place complete, a low-pressure return-circulation steam-heating apparatus in the Court-House and Post-Office Building at Topeka, Kansas, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

JAS. G. HILL,
380 Supervising Architect.

RIP-RAP.

U. S. ENGINEER OFFICE,
NEW LONDON, CONN., March 27, 1883.

Sealed proposals in triplicate will be received at this office **until 11 o'clock A. M., on the 24th day of April, 1883,** for rip-rap granite, to be delivered in breakwater at

Clinton Harbor, Conn.,
Greenport Harbor, New York,
Port Jefferson Harbor, New York.

Specifications and blank forms for proposals and for guaranty will be sent on application to this office.

J. W. BARLOW,
382 Major of Engineers, U. S. A.

SEWER.

[At Buffalo, N. Y.]
March 24, 1883.

Sealed proposals will be received by the Board of Sewer Commissioners of the city of Buffalo, N. Y., at their office No. 31 City and County Hall, in said city, **until Friday, April 13, 1883, at 3.30 P. M.,** for the construction of Section "C" of the Buffalo Trunk Sewer, in accordance with plans and specifications on file in said office.

Each proposal must be accompanied with a bond in a penalty of 25 per cent of the bid executed by two sureties residing in the State of New York, conditioned that the successful bidder will execute the contract and give security therefor as required by the specifications.

D. C. BEARD,
381 Chairman Board Sewer Commissioners.

PROPOSALS.

LOCKS.

[Near LaGrange, Ill.]

UNITED STATES ENGINEER OFFICE,
25 HONORE BUILDING,
CHICAGO, ILL., March 29, 1883.

Sealed proposals in triplicate will be received at this office **until 12 o'clock, noon, Saturday, April 21, 1883,** for furnishing stone for the construction of two (2) locks on the Illinois River, near LaGrange and Kampsville, Ill.

For specifications, blanks for proposals, and all information, apply at this office.

W. H. H. BENYAURD,
381 Major of Engineers.

FURNITURE.

[At Albany, N. Y.]

OFFICE OF THE SECRETARY,
TREASURY DEPARTMENT,
WASHINGTON, D. C., March 17, 1883.

Sealed proposals will be received at this office **until 1 o'clock, P. M., of Saturday, March 31, 1883,** for manufacturing, delivering, and placing in position, in complete working order, certain furniture for the United States custom-house, court-house and post-office at Albany, N. Y.

Upon application to this office, detailed information will be furnished to furniture manufacturers desiring to submit proposals.

The Department reserves the right to reject any or all bids, or parts of any bid, and to waive defects.

380 W. F. FRENCH, Acting Secretary.

SEWERS.

[At Waterbury, Conn.]
March 17, 1883.

Sealed proposals for the construction of about two miles of brick and pipe sewers in the city of Waterbury, Conn., will be received by the Board of Sewer Commissioners **until 2 P. M. of Thursday, April 12, 1883,** at which time they will be publicly opened and read.

Bids are to be made on the forms furnished by the Commissioners and accompanied by the proper bond.

Forms of proposal and specifications may be obtained and plans seen at the office of the City Engineer, Baldwin's Block, Bank Street, on and after Monday, March 26. The Board reserves the right to reject any and all bids.

By order of the Board of Sewer Commissioners.

380 N. J. WELTON, C. E.

POST-OFFICE.

[At Port Hope, Ont.]

DEPARTMENT OF PUBLIC WORKS,
OTTAWA, March, 1883.

Sealed tenders, addressed to the undersigned, and endorsed "Tender for Post-Office, etc., Port Hope, Ont.," will be received at this office **until Tuesday, the 10th day of April next, inclusively,** for the erection of a post-office at Port Hope, Ont.

Plans and specifications can be seen at the Department of Public Works, Ottawa, and at the custom-house, Port Hope, on and after Thursday, the 22d inst.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures.

Each tender must be accompanied by an accepted bank check, made payable to the order of the Honorable the Minister of Public Works, equal to five per cent of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted, the check will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order. F. H. ENNIS,
380 Secretary.

LIFE-SAVING STATION.

[At Barnegat City, N. J.]

TREASURY DEPARTMENT, OFFICE OF GENERAL SUPERINTENDENT, U. S. LIFE-SAVING SERVICE,
WASHINGTON, D. C., March 30, 1883.

Sealed proposals will be received at this office **until 12 o'clock, noon, of Wednesday the 18th day of April, 1883,** for the construction of a life-saving station at Barnegat City (south side of Barnegat Inlet), on the coast of New Jersey.

Bidders will state in their proposals the time within which they will agree to have the building completed ready for occupancy.

Each bid must be accompanied by a bond in the sum of five hundred dollars with two good and sufficient sureties conditioned that the bidder shall enter into contract without delay, and give such bonds as security for the faithful performance thereof as may be required, if his bid be accepted, or by a deposit of five hundred dollars U. S. currency or bonds to be returned to the unsuccessful bidder after the award of the contract, and to the successful bidder after his contract and bonds for the faithful performance of the terms thereof shall be approved by the Secretary of the Treasury. Specifications and plans, forms of proposal, contract and bonds, can be obtained at the offices of the Collector of Customs at Philadelphia, Pa.; J. G. W. Havens, Superintendent Fourth Life-Saving District, Metedeconk, N. J.; Captains G. R. Slicer and J. H. Merryman, U. S. R. M. Superintendents of Construction of Life-saving Stations, No. 3 Bowling Green, New York City; J. H. Ridgway, Keeper Life-Saving Station No. 17, Fourth District, Barnegat, N. J. and also upon application to this office.

All proposals must be endorsed "Proposals for the construction of a Life-Saving Station," and addressed to the General Superintendent, Life-Saving Service, Washington, D. C.

The right to reject any or all bids or to waive defects, if deemed for the interest of the Government, is reserved.

T. I. KIMBALL,
381 General Superintendent.